

DEPARTMENT OF APPLIED STATISTICS
UNIVERSITY COLLEGE, UNIVERSITY OF LONDON

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MEMOIRS

BIOMETRIC SERIES IX

A MONOGRAPH ON ALBINISM IN MAN

BY
KARL PEARSON, F.R.S., E. NETTLESHIP, F.R.C.S., F.R.S.
AND
C. H. USHER, M.B., B.C. CAMB.

TEXT

PART IV, APPENDICES

APPENDIX A. DESCRIPTIONS OF PEDIGREE FIGURES
APPENDIX B. BIBLIOGRAPHY

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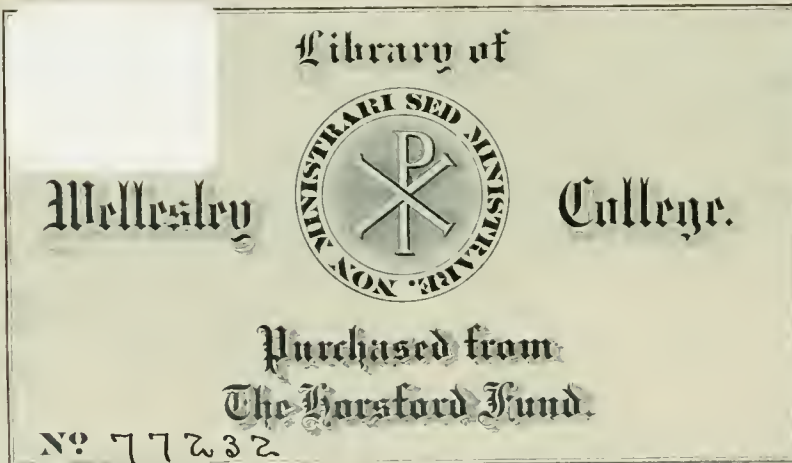
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BIOMETRIC SERIES IX

ALBINISM IN MAN

CORRIGENDUM TO *ATLAS*, PART II

Plate *a*. Owing to a misunderstanding on the part of the engraver, the blocks which represent Figs. (i) and (ii) have been interchanged with the blocks of Figs. (iii) and (iv). The reader must suppose the two diagrams with orange pigment interchanged with those without such pigment. The descriptions on the Plate itself, the references under Plate *a* on p. iii of *Atlas* to Part II, and the accounts on pp. 273 and 274 of these figures in Part II, *Text*, are then correct. In other words, on Plate *a* make no change in the printed descriptions, but mark on plate: *Interchange coloured engravings right and left*.

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PROVISIONAL PREFACE TO PART IV

WE wish to repeat here¹ the expression of our most hearty thanks for the very valuable aid we have received from many ophthalmological surgeons, medical men and lay workers in the preparation of the numerous pedigrees, which are printed for the first time in this part of our Monograph. We are very deeply conscious of the time and labour which many of our correspondents have willingly given in order to assist in this collection of albino family histories. We much regret that delay has taken place in their publication, and that they should even now be issued without Part III of our memoir in which they are statistically reduced and analysed. Not only did further delay seem discourteous to our numerous helpers, but there has been some loss to the value of Part I from the absence of both Pedigrees and References; still greater inconvenience would be felt in studying Part II. We trust it will be possible to issue Part III completing the whole work in the course of the next year.

The Descriptions of the Pedigree Plates and the Bibliography here provided show many signs of the long period during which the work has been in progress. In the course of the eight years wherein they have been preparing this memoir the authors have learnt much, and their standpoint as to the relative importance of the various facts described has no doubt been modified, and this will be to some extent evident in the family histories, the earliest of which were printed off with the plates more than six years ago. Further, the Bibliography printed off up to 1910, has had to be extended to the present date and by the inclusion of many works dealing with topics which the authors did not originally contemplate including in their investigation. They can only trust that the delay and the resulting rather amorphous growth of this work may in some respects not be without compensation to the reader.

¹ See Provisional Preface to Part I, p. v.

KARL PEARSON.
E. NETTLESHIP.
C. H. USHER.

June, 1913.

ADDENDA AND CORRIGENDA TO TEXT. PART IV

A. *Descriptions of Pedigrees*

p. 11, Fig. 48, l. 11: *for* III. 6 and 7 *read* IV. 6 and 7.

p. 32, Fig. 223, l. 1: *for* VI. 1 *read* V. I.

p. 83, Fig. 509. This pedigree is based on the erroneous information given to Maass and Bandonin by the Three Graces or their show-manager. For more correct particulars, see Extra Pedigree X, p. 128 below.

p. 99, Fig. 576. It would probably be more correct to term this albino from the Gilbert Islands incomplete than complete. His hair is given in facsimile on Plate κ , not Plate K as stated in text.

p. 108, Fig. 630. Photograph, Plate OO (136), this should be Plate PP (139) and possibly Plate PP (140) as well.

p. 108, Fig. 632. A more ample pedigree with full details is given pp. 249–253, as Fig. 632 *bis*. Photographs of its members are provided Plate H (22) and Plate RR (147)–(150).

p. 109, Fig. 634, l. 3 and l. 4: *for* III. 5, III. 7, III. 8, III. 9, *read* II. 5, II. 7, II. 8 and II. 9.

p. 116, Fig. 648: *for* Plate OO (137) *read* Plate PP (142). Another version of this case has recently been provided by Dr Hugh Stannus; he states that these were three earlier albino children killed by tribal custom when born, and does not refer to the normal siblings mentioned in the account given us by Drs Brown and Robertson.

p. 117, Fig. 650. This is obviously the same family as that in Fig. 634. It was given in a later letter from Dr Magnus, and we did not understand that he had only modified his judgment as to the parents, I. 1 and I. 2, of an earlier pedigree, by considering that he could not definitely assert that they were normal.

p. 117, Fig. 652: *for* IV. 4, IV. 5, IV. 6, IV. 7, IV. 8, IV. 9 and IV. 10 *read* III. 4, III. 5, III. 6, III. 7, III. 8, III. 9, III. 10 respectively.

B. *Bibliography.*

p. v, No. 147: *for* Gualtier *read* Gaultier.

p. vii, No. 259: *for* Raffenal *read* Raffenel.

p. vii, Nos. 231 and 253: *for* Von Ammon, A. F. *read* Von Ammon, F. A.

p. xii, Nos. 437, 438, 462: *for* Maas *read* Maass.

p. xii, No. 461: *for* Ehrman *read* Ehrmann.

p. xiii, No. 496: *for* Seligman *read* Seligmann.

p. xiv, No. 505: *for* Allen, G. R. *read* Allen, G. M.

APPENDIX A

DESCRIPTION OF PEDIGREE PLATES¹

PLATE I. Fig. 1. Three albinos (Gen. IV. 5, 6, 8) out of six children the issue of 1st cousins (III. 2 and 5) whose fathers (II. 2 and 4) were brothers. IV. 6, Mr Stanford Morton's patient at the Moorfields Ophthalmic Hospital, is a single woman aged 32; hair of head fine, moderately abundant, bright yellowish red, eyebrows almost and eyelashes quite white, hair of axillae and pubes said to be like head. Eyes fully albinotic, irides being very translucent where thin, the thicker parts almost white; marked nystagmus; refraction H. 4 to 5 D., V. corrected, $\frac{4}{80}$ and reads 12 J. Hair said to have been very fair but never quite white in childhood; intelligence good. IV. 5, married man of 35, merchant seaman, not seen; hair was originally "white" but became like that of his sister (IV. 6) when older; eyes said to have been always steady and sight good; has children but no details known. This man has been indicated by the sign for semi-albinism. IV. 8, female, died at age of $1\frac{11}{12}$ yrs.; had white hair and pink eyes "just like" IV. 6. IV. 3, 4, 7, siblings of the albinos; 4, aged 38, dark, husband dark, two sons dark; 3, aged 39, hair light brown, eyebrows and lashes very light, eyes blue, husband dark; 7, single woman, 28, hair and eyes like 3, appears (from description) to be myopic. II. 2 had fair hair and "brown" eyes; 4, light brown hair, blue eyes and "short" sight, died at 60; the wives, II. 1 and 5, had very fair hair and 5 certainly had blue eyes and lived to 86. III. 2 and 3 (parents of the albinos); 2, medium hair and brown eyes, died at 67, was 5 years older than 3 his wife who, now 66, has light mouse-brown hair without a tinge of red, and blue eyes; both had good sight. III. 5, now 62, blue eyes, hair formerly brown, has four daughters (IV. 9 to 12), one fair, three dark. III. 6 and 7 died young of measles, were fair; 8, 9, 10 all died young, no details. (Sample of hair of IV. 6 kept.) (Mr Stanford Morton.)

Fig. 2. Two albinotic siblings (V. 2 and 5) in a pedigree (incomplete) of five generations; mother's ascent not known; father's father (III. 4) and father's mother's father (III. 2) were sons of a half brother and sister (II. 2 and 3) by same father (I. 2). V. 5 was completely albinotic with very defective sight but of great energy and considerable intellectual power, tall and strong; married twice but no issue; lived to be 81. V. 2, albino died unmarried at 30, was only about two years older than V. 5. V. 3, born within a year of the last, died in infancy, said not to have been an albino. V. 4, also born within a year of the last, normal and left descendants none of them albinotic. IV. 7 had fits but lived to be over 80, was unmarried. V. 1, lived to be 98, unmarried.—The seven siblings (V. 1 to 7) were born in eight years; only one of them left issue. Two other consanguineous marriages produced no albinos. No record of colour of hair and eyes except in the albinos. (E. Nettleship.)

Fig. 3. Three albinos scattered in an extensive pedigree of four generations. IV. 23, Mr Lawford's patient at Moorfields Hospital, aet. 3 (1905), hair almost quite white, pupils red, irides pale gray-blue, nystagmus, poor vision; high H. and some As., R. H. 7 D. vertical, 8 D. horizontal, L. H. 5 D. and 6 D. correspondingly; child intelligent and well-developed. Feb. 1907, aet. 5. Refraction of R. H. 7 D. vertical, 9 D. horizontal, V. corrected $\frac{6}{36}$; L. H. 3.5 and 6 D. respectively and V. corrected $\frac{6}{36}$. Her eldest sib (IV. 21) has been marked semi-albinotic, hair very fair, eyes gray, sight good, eyes steady, aged 7. IV. 22, aged $5\frac{1}{2}$, hair brown, eyes gray-brown. Parents 1st cousins, children of two sisters; mother (III. 10) dark golden hair, gray-brown eyes, father (III. 22) fair hair, blue eyes. III. 33, girl aged about 13 (1905), albino, hair said to be whiter than IV. 23, sight very bad and wears glasses; has been Hospital patient of Mr Work Dodd but notes cannot be found. III. 32, fair hair and blue eyes, III. 34,

¹ The following descriptions have been composed from the notes of the cases sent by the respective contributors, frequently supplemented by further written enquiries, and in the case of families living in and near London by our own personal investigation of the family history made with the consent of the contributor. Although we believe that serious errors have been avoided a certain number of minor mistakes and omissions have occurred and small discrepancies may be found between Figure and Description in a few instances; these when possible are indicated by italics. Furthermore the minor degrees of albinism described in the text are not always consistently indicated on the corresponding Figures; a few of the Figures show by the half-black circle, degrees of fairness indicated as normals in other Figures. Some of such inconsistencies are due to unconscious variations of standard difficult to avoid in an investigation extending over nearly four years and dealing with cases of every degree; others are the result of a definite attempt to mark in the Figure all the individuals with decidedly fair hair. Further the degrees of albinism in man are so varied and yet so continuous that it is not easy to classify cases into the two simple categories, complete albinism, ●, and incomplete albinism, ○, of the plates.

For the above and other reasons the Plates should always be studied with their corresponding descriptions. The term *sibship* is used for the offspring of one pair of parents. A bent rule in the plates — denotes a marriage, a wavy line below a sibship, that order of birth was not recorded. A horizontal rule between two individuals marks them as twins. A whole black circle marks a case of albinism; a half-black circle incomplete albinism (see above) and a circle with a cross on it deformities or diseases which may possibly be correlated with albinism. The nature of consanguineous marriages is marked on the plates but frequently not recorded again in the descriptions.

brown hair and eyes. Parents of these three siblings not consanguineous.—I. 3, an albinotic woman, white hair and pink eyes, who emigrated to Australia at the age of 20 and has not been heard of since. I. 2, one of her brothers with very fair hair and blue eyes, has been marked semi-albinotic.—I. 2 married twice and left issue by each; the two wives were not related by blood either to him or each other. I. 4, other siblings of whom there is no information. Colour of hair and eyes (on the testimony of III. 10 an intelligent woman who made many enquiries and of the mother of III. 33) ascertained for 51 descendants of I. 2 and for some of their husbands and wives; of the 51, four had "fair" or "very fair" hair and blue eyes, besides the four with fair or very fair hair and blue eyes noted above, also the following, viz.: II. 1 to 8, and 10 (the only pure dark one was 9, Nos. 11, 12 and 13 being fair with more or less brown eyes); III. 2, 6, 7, 8, 11, 14, 16, 19, 20, 26 (those known to be pure dark being 9, 27, and probably 34, the others known had either dark hair and blue eyes, as Nos. 12, 25 and 27, or various shades of "golden" hair and grayish-brown eyes as Nos. 4, 13, 17 and 29); IV. 2, 3, 6, 18 and 20 (those pure dark being 12, 13, 14, 24 and 28; mixed dark hair and blue eyes, Nos. 1, 4, 5, 8, 9, 10, 11). Summary; fair or very fair with blue eyes, 24 in addition to the four noted above; dark hair and blue eyes, and various shades of medium hair and eyes 17; pure dark hair and eyes 9. The only consanguineous marriage was the one between III. 10 and 22. No degeneracies. Twins twice in one childship of 13. (Mr Lawford.)

Fig. 4. Three albinotic children (II. 2, 3, 4) whose father (I. 2) has very fair hair and moustache but good eyes and normal in every respect, and mother (I. 3) very dark hair and eyes, tall and handsome. I. 1, a sister of the father of the albinos, has brown hair and none of her children are albinotic. (Dr F. W. Lindsay.)

Fig. 5. The two youngest of five children albinotic, the three elder ones dark haired. II. 4, aged 6, full albino with nystagmus, translucent irides, red pupils and high H. As., H. 3 D. vertical, 8 D. horizontal. Mother (I. 2) dark brown hair and blue eyes, father dark brown hair and brown eyes. (Dr Geo. W. Thompson.)

Fig. 6. Three albinos in a sibship of eight (II. 3, 5, 6). The other five are all fair in degrees, none dark. Father and mother both fair, not blood-relations. II. 3, aged 14, R. H. As., H. 6 D. vertical, 8 D. horizontal, V. corrected $\frac{6}{36}$, L. H. 2 D. vertical, 4 D. horizontal, V. corrected $\frac{6}{36}$, hair yellowish-white, eyelashes quite white, irides translucent, pupils red, horizontal nystagmus, fundus albinotic. II. 5, aged 12, slight As. but refraction not fully given, irregular nystagmus, divergent squint, V. barely $\frac{6}{60}$, irides slightly pigmented but pupils sometimes red, hair of scalp, eyebrows and eyelashes nearly white, fundus totally albinotic. II. 6, aged 11, H. 1 D. nearly vertical, 3.5 D. nearly horizontal, V. corrected $\frac{6}{18}$ barely, irides greenish-gray, hair of scalp very fair, eyebrows rather darker, eyelashes brownish, fundus only slightly albinotic. II. 7, aged 10, hair darkish blond, eyebrows and lashes lighter, V. $\frac{6}{6}$ with slight H. As., fundus light red; this boy probably not fairer than the other non-albinotic siblings. (Dr Victor Hanke, Vienna, through Mr J. Herbert Parsons.)

Fig. 7. Albinotic girl aged 7 (III. 1), the only sibling (III. 2) brown-haired. III. 1, hair, eyelashes and eyebrows nearly white and the colour has not become darker since birth; hair of scalp continued as fine white down on forehead; irides gray-white and translucent, pupils red, fundus quite albinotic; nystagmus and divergent squint; refraction slightly M., V. cannot be determined accurately. Mother and father both dark-blond, not consanguineous; mother's father said to have been an albino. (*Idem.*)

Fig. 8. One albino, the third born of four children (II. 3), seen when 22, March, 1898; albinism complete, V. $\frac{6}{60}$ with each, not improved by the glasses that correct his mixed As. of M. about 2 D. vertical and H. about 2 D. horizontal (figures not exactly the same for R. and L.); horizontal nystagmus; the return movement from R. to L., being quicker than from L. to R. Uses + 8 D. for reading and manages with these lenses to read 1 J. very close. Was reading for the Church and has since succeeded in passing and been ordained. His two brothers (II. 1 and 2) rather dark are respectively three and a half and two years older, and the sister (II. 4) six years younger, than the albino (II. 3); no conceptions between II. 3 and 4, though parents were never parted; II. 4, nearly black hair, blue-gray eyes. Parents not related and no consanguineous marriages known further back; father (I. 1) light blue eyes, mother (I. 2) dark blue, and her sister (I. 3) blue; the only child of I. 3 brown. Mother (I. 2) attributes the albinism to having seen an albino rabbit when she was 3 months pregnant with II. 3. The albino was born at full time and mother's health excellent. (E. Nettleship.)

Fig. 9. Two albinos in a native Singhalese family. II. 3, man aged 28 (1906), intelligent, fairly educated, of rather small build, skin very fair, hair of head golden, moustache darker and reddish, eyebrows, eyelashes, pubic and axillary hair same golden as that of head, small hairs of arms and legs white; scattered over thorax and upper part of back, temples and back and sides of neck are some "small patches of pigment" which the patient says were caused by his "exposing himself to the sun in the hope of turning black all over," those on temples and neck are mere dots like freckles; skin of hands and feet wrinkled as if from laundry-work (though he never works in water), and cracks if much exposed to sun; teeth all present and good; marked nystagmus; periphery of irides greenish-yellow, pupillary zone reddish-brown; M. 2 D., V. corrected being $\frac{6}{24}$; fundus light pink, the choroid being actually lighter than the optic disc. He is the youngest of five, all males, three died between 11 and 20, causes of death unknown. Mother (I. 4) an ordinary pure Singhalese aged 40; father (I. 3) also a pure dark Singhalese died at 49, cause of death unknown; he had an albinotic sister (I. 2) who had no children and died many years ago,

and ten other brothers and sisters all dark and now all dead except one. No history of any other albinos nor, so far as is known, of any "fair" as distinguished from fully "dark" members of the family (the natives distinguish between "dark" and "fair" members of their own race, as Europeans do in their's). The illustration (Plate P.) is from an excellent portrait of the albino side by side with his only living brother (II. 2). (Sir Allan Perry, M.D., Colombo, Ceylon.)

PLATE II. Fig. 10. Seven albinos in a sibship of nine (IV. 13 to 25) and probably two other single ones. Six of the nine seen; IV. 17 died, aged 46, of disease of stomach, II. 3 long dead, and IV. 26 not seen; IV. 14 is mentally feeble, IV. 20, aged 46, is epileptic since boyhood but is an intelligent robust farmer; all the others well-developed, healthy, intelligent and successful in various business and industrial occupations; they vary in height from 5' 4½" (IV. 21) to 5' 10" (IV. 20); only two married, IV. 20 (epileptic) married when 44, has had two premature children who died (no particulars about wife), IV. 16 married at about 30, two children, aged 24 and 21, both dark, wife not a cousin, has been in an asylum 17 years. The seven cases are as follows (circumstances prevented a precise estimation of V. and refraction in any of them; colour vision good in all (wool test); they can all read the newspaper): IV. 13 now (1906) 60, hair white with slight yellow tinge, eyebrows and lashes quite white, skin blond and irritable (cannot wear flannel), irides blue, fundus light, rapid nystagmus (120 per minute), corneal nebulae from ulcers at aet. 25, is myopic, but V. and exact refraction not measured, strabismus, but notes do not specify what kind. IV. 14, aged 58, physically strong but intellect weak and cannot do any work, hair, eyebrows and lashes quite white, skin blond all over, nystagmus 66 per minute, irides blue, pupils red, fundus very light, internal squint of L., R. counts fingers at 6', myopic, L. fingers at 20', hypermetropic. IV. 16, aged 54, hair, eyebrows, lashes and moustache quite white without a trace of yellow, lateral nystagmus 132 per minute, irides blue, pupils red, fundus light, L. internal squint, R. fingers at 15', mixed As., L. fingers at 2', myopic. IV. 17 died at 46 from chronic disease of stomach, had oscillating eyes and red pupils and hair white with slight yellow tinge (sample seen). IV. 19, aged 48, scars in neck from glandular abscesses in boyhood; skin blond all over and more sensitive to heat than his brother, IV. 20; hair, brows and lashes quite white, teeth very good, lateral nystagmus 148 per minute, L. internal squint, irides gray and transmit red light in places, pupils red, is myopic, but V. with his -2 D. spectacles only $\frac{2}{3}$, fundi light as usual. IV. 20, aged 46, tallest of the family, 5' 10", and epileptic from boyhood, but fits do not seem to have damaged him seriously; hair, brows and lashes quite white, skin blond all over and chaps easily, lateral nystagmus 108 per minute, irides very light blue, pupils red, fundus light, no squint, R. fingers at 4', myopic, L. fingers at 9', mixed As. IV. 21, aged 43, hair quite white except a small part on top of head which is light yellow, brows and lashes quite white, skin blond all over, easily sunburnt, hands easily become rough and red; lateral nystagmus 72 per minute, irides blue, pupils red, fundi extremely light and reddest at yellow spot, at lower part of L. fundus a circular sharply-defined spot, about $\frac{1}{3}$ the size of optic disc, *darker in colour than the rest of fundus and with a conspicuous black pigmentation at its upper part*, this spot is behind the retinal vessels and its floor is crossed by a large choroidal vessel; it looks like choroiditis, but may perhaps be the result of a haemorrhage at birth or may be congenital. The two non-albinotic siblings are: IV. 15 with dark brown hair and irides and slight myopia; she has three children (V. 9, 10 and 11), aged from 23 to 17, all with brown eyes and either brown or black hair; husband not a cousin; and IV. 18 who died of "water on the brain from over-study" at 15, and had brown eyes and dark brown hair. It is probable that II. 3, paternal grandmother of the above sibship, was an albino; one of her children, III. 6, on first meeting one of the albinos, viz. IV. 13, told her that she would have recognized her (IV. 13) by her resemblance to her own mother (II. 3); further, the hair of II. 3 preserved in a brooch has been seen and is like the hair of most albinos, *i.e.* almost but not quite white, scarcely so white as the white hairs in a specimen taken from her husband (II. 1) who originally had black hair; it is not known how old II. 3 was when the specimen was taken from her (she was married in 1790); she and her husband not cousins; her husband had four brothers and six sisters, born between 1745 and 1764. IV. 26 is almost certainly an incomplete albino; she is now elderly with fair golden hair streaked with (senile) white (specimen seen), eyes described by her son, who is a medical man, as bluish-gray, nystagmus, and fair complexion, she also has a squint of which no particulars are given; one of the family who knew her 30 years ago describes her then as "very fair, almost blind-fair with very weak eyes, a slight squint and a shake in her head." IV. 26 has four children (*information since pedigree was engraved*), none light, and some grandchildren, none fair; she and her husband not cousins. IV. 26 is cousin to the albinos IV. 13-21, their mothers (III. 10 and 16) being sisters, but no kinship exists between IV. 26 and II. 3. Prevalent colour of hair and eyes; in III. 1 to 8 two or three were black (including 8, father of albinos), not one fair; III. 9 to 16 all had blue eyes (including 16, mother of albinos) and brown (not specially fair) hair; III. 17 to 19, partly dark; III. 23 to 34 all had brown eyes and hair; of IV. 1 to 6, two black, none fair; of IV. 7 to 11, four black, two red-haired; as to the others of the pedigree no detailed information but few very dark. The whole family is north Scottish. (C. H. Usher.)

Fig. 11. Two albinos out of eight, the other six having normal eyes. Both parents, dark brown irides and not consanguineous. No albinos known in relations. II. 1, aged 23 (1905), irides bluish-gray, fundi very pale, hair albinotic; high M. As., R. M. 8.5 D. vertical, 6 D. horizontal, L. 10.5 D. vertical, 8 D. horizontal, V. of each corrected $\frac{6}{3}$. II. 2, albinotic brother with nystagmus. (Mr Roxburgh.)

Fig. 12. Three albinos (II. 3, 4 and 6) out of nine; all have very white hair, red pupils, nystagmus and "short sight" and are not benefited by glasses. II. 3 died of phthisis at 32 in 1905; the other two albinos are aged 31 and 26 and healthy; no other tubercle known. Fair hair prevalent in father's people, reddish hair in mother's; both parents Celtic Highland Crofters. Careful enquiry reveals absence of known consanguinity; nor did parents come from same locality. (Dr A. C. Miller.)

Fig. 13. Three albinos out of ten, all lived to maturity, one still living between 60 and 70, two died at about 60. Parents lived to old age. No consanguinity traceable. (Dr A. C. Miller.)

Fig. 14. Albinotic boy aged 12, the only child; white hair, irides gray, pupils red, fundi typically albinotic, horizontal nystagmus, photophobia; simple H. As. 2 D. horizontal in each eye, V. $\frac{1}{4}$ th. Parents Russian Jews from Zanzibar; father has yellowish-brown hair and green-gray irides, i.e. he is, relatively to his ordinary racial colour, decidedly fair. No other details. (Dr Meyerhof, Cairo.)

Fig. 15. One albino, aged 9, in sibship of four. No other cases known; parents (II. 2 and 3) have made enquiry. Consanguinity not enquired for. (Mr Lang.)

Fig. 16. One albino, aged 12, in sibship of five; high H. As., R. H. 7.5 D. vertical, H. 3.5 D. horizontal, L. H. 8.5 D. up-out, H. 5 D. up-in, V. corrected $\frac{6}{36}$. He is considered to be "backward," has highly arched palate with slight defect at centre, line of opacity on back of R. lens, and bad teeth. Father (II. 4) and his parents (I. 3 and 4) dark; mother (II. 3) hair now brown, was fair, eyes blue, has a brother and sister both fair, her mother (I. 1) was dark, her father (I. 2) fair; II. 3 was frightened by white rat a week before birth of III. 1. No consanguinity of parents (II. 3 and 4) or grandparents (I.). (Mr Hudson for Mr Lang.)

Fig. 17. A woman (II. 3) has an illegitimate albinotic daughter (III. 1) now aged 42 (1906), who is married and has four children of whom three are rather dark with normal vision, one rather fair and hypermetropic (IV. 1 to 4). The albino's hair faint straw colour, iris pale gray, fundus pale, refraction M. As., R. M. 2.25 D. vertical, L. M. 2 D. vertical, 1 D. horizontal, V. corrected $\frac{6}{18}$ partly, nystagmus and slight lateral rhythmic movements of head. Father (II. 4) no details; mother (II. 3) dark hair and blue eyes, had seven sisters and five brothers (II. 1 and 2) all with dark hair, some with blue eyes some brown; mother's parents (I. 1 and 2) said to have had dark hair and blue eyes. No known consanguinity. (Dr E. J. Smyth.)

Fig. 18. Two complete albinos in sibship of five, III. 2, aged 29, III. 3, aged 27; in both, hair quite white, nystagmus, red pupils, very defective sight. Of the other three III. 1, aged 31, is dark, married and has four dark children (IV. 1); III. 4 died a month old, was dark; III. 5, aged 24, dark, married and has three dark children (IV. 2). Mother (II. 2), Irish, aged 52, dark, had nine siblings all dark (II. 1). Father (II. 3), aged 54, dark, English (Warwickshire), his father (I. 3) not an albino. (Dr John Hackney.)

Fig. 19. Three albinos and a monstrosity out of eight children, twins once. V. 1, aged 25 (1906), good health, saw Mr Treacher Collins at Moorfields when 15; marked albinism, lateral nystagmus, V. R. $\frac{6}{60}$, L. $\frac{6}{24}$, refraction not mentioned. V. 2, born about four years after 1, died at 11 months of age. V. 4 one of twins died of "consumption," 7 months old; the other twin, not albinotic, died at 13 months also of "consumption." Between V. 2 and 4, a "monstrosity" was born. Of the three others (V. 6, 7, 8) one died at 4, one at 6, and the last (V. 8) is living, aged $4\frac{1}{2}$. Mother (IV. 1) mentally defective, hair and eyes light brown; no information obtainable on her side. Father has a brother (IV. 3) dark haired with blue eyes who has five children (V. 9), none albinos; and a half-brother (IV. 4) with four children (V. 10), none albinos. III. 1 and II. 1 had dark hair and I. 1 was not albinotic. (Mr Treacher Collins.)

Fig. 20. Two albinos, 1st cousins. III. 6, aged 18 years (March, 1905), is the third born of eight, *all girls*; she is a complete albino, hair white, nystagmus, iris translucent, total absence of pigment in fundus; compound M. As., R. M. 4 D. vertical, M. 1 D. horizontal, L. 5.5 D. vertical, M. 3 D. horizontal, V. corrected $\frac{6}{36}$; skin irritable; liable to eczema of scalp and eyelids. Was first seen at age of 10 months in 1888 when Mr Percy Blumer found the same conditions as above described and added that up to the age of 6 months, sight had been very poor but had improved during the three or four succeeding months. The other albino (III. 1), almost of same age, is first born of three children, and 1st cousin of III. 6. All four parents of the two albinos (II. 1 and 2, 3 and 5) are fair, 1, 2 and 5 especially so, but 2 and 3 are the only pair of these four related by blood. The seven sisters of III. 6 (4, 5 and 7) all described as fair. No known history of albinism further back. The two grandparents I. 1 and 2 are now (1905) in an asylum, and I. 1 said to be blind. No consanguineous marriages. (Mr Percy Blumer.)

PLATE III. Fig. 21. A single case, IV. 2, of general incomplete albinism in an extensive genealogy; subsequent pigmentation of hair and irides without improvement of sight; slight stationary congenital (lamellar) cataracts; premature birth attributed to overwork of mother. Prevalence of moderately fair hair, often with blue eyes, in several near relations of the albino. Parents second cousins; three of the four grandparents first cousins. The albino (IV. 2) was born at eight months with fair hair and very light irides; at a month old had convulsions; mother noticed his eyes "glared red in a dark place," and he disliked daylight. When

3½ years old was seen by Mr (now Sir H. R.) Swanzy, who found fair hair, a pink reflex from pupils and nystagmus; Sir H. R. Swanzy believes the irides were dull gray, the fundus was certainly albinotic. The lamellar cataracts were not noted till a later examination, at about 13, when also Mr Swanzy found hypermetropia about 4 D. in left eye; the left cataract was exceedingly thin. When 16 Mr Swanzy asked me to see him in reference to the right cataract, which was thought, but probably without good reason, to be getting denser; the hair was then "a good brown, and I (E. N.) should not have suspected albinism had not Mr Swanzy told me of the condition in early childhood"; lateral nystagmus; L. eye V. $\frac{6}{80}$, not improved by glasses, very faint lamellar opacity of lens not at all accounting for the defect of sight. R. eye sees much less well, corresponding to the much greater degree of lenticular opacity. Sight has never got worse but the nystagmus persists; he is now (1906) 36, unmarried, a clergyman in charge of a parish. All but one (IV. 4) of his siblings born fair but hair and eyes became darker afterwards. Father (III. 1), his father (II. 1), also mother's father (II. 7, a 1st cousin of II. 1) all had blue eyes and more or less fair hair; mother (III. 8) dark. (Sir H. R. Swanzy, and E. Nettleship.)

Fig. 22. Incomplete partial albinism (skin and hair) in grandson (V. 18), paternal half-uncle (IV. 21) and maternal grandmother (III. 4). No consanguinity known anywhere, full enquiry. V. 18, aged 14 (1906), thought by mother at first to be "blind-fair," i.e. a full albino, but she found he saw well; now hair light yellow, eyebrows and lashes still lighter, skin exceedingly fair, eyes blue, fundus not very light, no nystagmus, vision normal except slight astigmatism in left. IV. 21, paternal half-uncle of V. 18 (the fathers were different and not related), hair very light, eyes blue, no nystagmus, "was very like" V. 18. III. 4, hair at first light yellow but when she died in 1900 at 53 dark brown streaked with (senile) white (specimen seen, certainly not artificially coloured), eyelashes remained almost white till death, eyes blue; when young was intolerant of light; was called "blind-fair" and said to be "short-sighted" and have "moving eyes" (nystagmus); this account given by IV. 1. Hair- and eye-colour of others: II. 1 and 2 red with blue eyes, 5 fair, 3 and 4 dark; III. 1, 2, 3 dark, 9—15 dark, 8 fair, 7 unknown; IV. 1 and 2 auburn with blue eyes, 19, 20, 28 fair, all the rest with one or two exceptions dark or brown hair and brown eyes; V. 1, 2, 3 fair, 7 both very fair, 12, 14, 16—25 and 27 all fair in degrees, 16, 17, 22, 23 and 25 being auburn with blue eyes, 4, 5, 6, 9, 26 dark, the rest unknown. III. 2 died at 57 in a lunatic asylum, where he had been for six years. (C. H. Usher.)

Fig. 23. Four albinos, only one of whom is living, viz. V. 8, aged 3 (1906), who has hair, eyelashes and eyebrows almost quite white, blond skin, lateral nystagmus, dark blue irides but typically albinotic fundus, and mixed astigmatism; he is eighth of nine, of whom five died, viz. V. 1 stillborn, 3 at fifteen months of bronchitis had very fair hair and dark eyes, 4 at two years from "catarrh of stomach" had brown hair and very dark eyes, 6 at six months of bronchitis had dark hair and eyes, 7 at two years and a half of measles had light golden hair and blue but steady eyes and good sight; the three living besides the albino are V. 2, aged fourteen, 5, and 9 aged two months, all with dark brown hair and brown eyes.—III. 21, light yellow hair, blue eyes, "near sight" but eyes said to be steady; III. 22 had blue eyes, hair like V. 8, and wore spectacles for distance, eyes said to be steady, died at 73, his wife not a cousin; II. 7, an aunt of III. 21 and 22, had quite white hair but is believed not to have been near sighted. Hair- and eye-colour of others: IV. 1, golden hair, blue eyes, good sight; 2 and 13 to 16, all dark or black hair and brown eyes: hair fair, eyes blue, II. 1, III. 1 (very fair), 2, 3, 10, IV. 18 and 19, V. 14 and 15; hair brown or dark or reddish, eyes blue, II. 2, 3, 4, 5, 6, III. 4, 5, 6, IV. 13 and 17; hair and eyes dark, III. 11, 12, 15, 20, IV. 2, 8, 9, 10, 11, 12, 13, 15, 16, 24, V. 16, 17. Parents of V. 8 are first cousins, and the mother's father (III. 22) was albinotic. III. 12 turned gray between 18 and 19, and IV. 4 very early. Family generally healthy and live fairly long. II. 1 and 2 had same surname as II. 3—6, and the two branches were distantly related. III. 1, 2 and 3 had each a different father. Mother of V. 8 frightened by a cat several months before his birth. (C. H. Usher.)

Fig. 24. Two albinos out of seven, one IV. 6, died young, the other IV. 5 grew up; no other particulars. IV. 7 had club-foot and died young, the others are normal. Parents of the albinos first cousins. IV. 2, first-born sibling of the albinos, has also married a cousin and has a child (V. 1) believed not to be albinotic. (C. H. Usher.) *Discovered later to be same family as that given more fully in Fig. 312.*

PLATE IV. Fig. 25. One well-marked albino (VI. 22) and two doubtful (V. 8 and 10) in a very extensive pedigree in which blue eyes and either fair or reddish hair were very prevalent. VI. 22, aged 24, hair, eyebrows and lashes quite white, skin blond, tender and burns easily from sun; irides blue, pupils red, fundus very light; lateral nystagmus 134 per minute: refraction mixed astigmatism, V. $\frac{4}{80}$, colour-vision good; well grown, strong, healthy and intelligent, but says he gets tired sooner than the rest of the family; had acute pulmonary illness at 10 and again at 14; escaped both measles and scarlet fever though living in same house as his siblings when they all had both diseases; has at times involuntary lateral movements of head. Three of his four siblings have blue eyes and at least one quite fair hair; only one (VI. 19) dark; of his seven nephews and nieces four have blue eyes and fair hair. Both parents (V. 22 and 26) fair. V. 8 and 10 died in early childhood of diphtheria; according to their mother (wife of IV. 11), who is now 90, they had white hair and blue eyes; their brother V. 9, now about 63, has blue eyes and yellow-red hair. All those indicated by half-black circles are stated to have had more or less

fair hair and blue eyes; some twenty others are said to have blue eyes with more or less dark hair, viz. III. 7; V. 6, 7, 27, two of 28; VI. 3, 21, 23, 27, 28, 31, 32, 33. The only instance of nervous degeneracy was IV. 7, who died young of epilepsy. No consanguineous marriages. (C. H. Usher.)

Fig. 26. A completely albinotic child (V. 22) born sixteen years after last previous living child (V. 19); two supposed miscarriages each at third month, respectively six and fourteen years before birth of albino (no doctor sent for). V. 22, aged 2 (1906), hair, eyebrows and lashes quite white, skin fair all over, irides blue, pupils red, fundus very light (optic disc darker than rest of fundus), refraction hypermetropic (estimated 2 D. in left); double inguinal hernia; in other respects child seems normal but somewhat under weight. His eldest sibling (V. 18), aged 19, now has brown hair, blue eyes and decidedly light choroid; his hair was nearly as white as 22 in childhood, but he never had nystagmus. V. 19, aged 17, has blue eyes but hair brown, skin not fair and choroid not light. Parents first cousins; mother (IV. 8) dark brown hair, quite dark choroid, blue iris, all her four living siblings blue-eyed and the next born to her light hair, the others dark; father (IV. 13), hair light brown, moustache and whiskers yellowish, iris blue, choroid medium; in childhood his hair was as white as his son V. 22 the albino; a healthy, active man; of his siblings IV. 14 is dark, 15 who died at 3 years, had white curly hair but steady eyes, 16 has yellow hair and blue eyes and has three children (V. 28 to 30) all blue-eyed, hair brown (28), fair (29), red (30). Other notably fair ones were the whole of IV. 12, and also III. 8, 10 and 22. Others with blue eyes were II. 7, all of 5, some of 6, also 7, 9, 10, 11 and 12; III. 11 blue eyes and yellow hair; several of IV. 3 and 4, several of 9 and 10; V. 7, 8. Dark hair and eyes are noted in I. 1, 2 and 6; II. 2; III. 1, 2, 21; one of IV. 3; V. 23, 24 and 27 (all black hair). (C. H. Usher.)

PLATE V. Fig. 27. Ten albinos in two generations (IV. and V.) and probably one (II. 10) in an earlier generation. Of the ten, V. 8, 15, 16 and 21 and IV. 13 and 15 are living and four (viz. IV. 15, V. 8, 15 and 16) have been examined; the albinism is complete in these four and from description appears to be so in all the others. The four examined all show typical appearances and symptoms; the nystagmus varies in rapidity and amplitude; V. in IV. 15, who is aged about 34, $\frac{4 \text{ to } 5}{60}$ and 6 J. very close, refraction M.; V. in V. 8, who is aged 10 and very intelligent and quick at school, $\frac{3}{80}$, refraction H.; V. 15, aged $2\frac{7}{12}$ (1905), the younger of twins (both living), is weak and badly nourished; V. 16 strong and well. Of those in Gen. IV., 14 died at 18 months, 17 at 26 years, probably appendicitis, and 20 at $1\frac{1}{2}$ year. Of the non-albinos in the sibship V. 7 to 17, 7 died at birth and was dark; 9 died at $2\frac{1}{2}$ years, "croup"; 10 living, dark hair and choroid; 11 died at 1 month, dark; 12, blue eyes, medium hair, strong; 14, aged $2\frac{7}{12}$ (twin of albino), blue eyes, rather light hair, robust; 17 miscarriage. Of the non-albinos in IV. 12 to 22, 12 is aged 40, dark, married 2 years, 1 child not light; 16 dark; 18 dark, married to dark man not a cousin and not of a light-haired stock, has three children, V. 19 dark, died in infancy, 20 medium hair, 21 albino (*supra*); IV. 19 medium hair; 21 and 22 both dark. Hair- and eye-colours in others: II. 10 was known as "Jan ban," i.e. "fair John"; is said to have had good sight and lived to upwards of 60; not seen by anyone now living but often spoken about. His wife (II. 16) dark. They had ten children (twins once), of whom none were fair and two (III. 19 and 25) very dark; III. 20 and 21 reddish hair, the rest "medium." None of IV. 3 to 11 or 23 to 29 appear to have been fair and many are dark. Full enquiry shows that with the exception of V. 12 and 14 described above, the great majority of the rest of the pedigree were either decidedly dark or "not fair"; it is unnecessary to give the details on this point. Note that twins occurred three times and always in the albinotic division. None of the albinos in V. 7 to 17 were born prematurely. (C. H. Usher.)

Fig. 28. Seven albinos in two large sibships and two other single ones. Six of the nine living (1905) and five of these fully examined; albinism complete in all with classical appearances and symptoms. Special points: V. 11, aged 28, skin not tender or irritable, no photophobia, "the sun does not trouble me more than other people," nystagmus 120 per minute, refraction M., V (uncorrected) $\frac{4}{60}$ and 1 J. at 4 inches, fundus very albinotic all over, but reddest, as usual, at yellow spot region. V. 13, aged 24, nystagmus 156, refraction H. 4 D. with 3 D. of As. axes not noted, V. corrected $\frac{6}{38}$, red area of choroid at yellow-spot and around disc much larger and more intense than usual; skin easily burns in sun. These two are healthy, strong, half-skilled labourers. V. 15 died at 14 years of rheumatic heart disease after a year's illness. VI. 9 died at 15 months old; it resembled the other albinos; its sib VI. 10, aged 10 months, light yellow hair, blue eyes, no nystagmus. V. 12 and 14, sibs of the albinos, both dark brown hair, no note about 16 and 17. IV. 8, examined in bed, aged 65, suffering from left hemiplegia, completely albinotic, choroids so pale that discs look quite dark by comparison; married at about 50 and has three children, the eldest being 15, all strong and well with brown hair and blue eyes (V. 19). IV. 12, aged 55, mother of V. 11 &c., aged 55, nystagmus 112 per minute, refraction M., fundus albinotic and large myopic crescents; skin easily made sore by sun; strong, healthy, intelligent, no illnesses; her children, including the albinos, all born at full time; married at 25. IV. 13, aged 53, nystagmus 96 per minute, refraction M. and V. with her concave glasses $\frac{1}{60}$, fundi shew usual appearances and large myopic crescents; was strong till she had ulcer of stomach at 15 and has had attacks since. IV. 9, 10, 11, 14, 15 all dark or very dark brown hair, IV. 9 had blue eyes, eye-colour of the others not noted. About II. 5 there are no details except that she is reported in the family to have been an albino; she had a brother

(who, with his offspring, is not shown in Fig. 28) who was not fair; he had a son (Gen. III.) with dark hair that turned gray early; this son had children (Gen. IV.), one of whom, a girl, had black hair that became quite white by the time she was 30. Hair- and eye-colour in others: Dark, I. 1, II. probably all except II. 5, III. 1, 2, 4, 7 to 11, 14, 15, 16, 18, 19, 21; more or less dark or brown with blue or gray eyes, III. 6, 13, 20; medium brown hair, blue gray eyes, 12; very dark hair, dark gray eyes, IV. 1, 2, 17 to 23, 24, 28, 29, 32; dark with blue eyes, 3, 26; light brown with blue eyes, 27, 30, 31; reddish hair, IV. 4 and V. 1, 5, 6, 7; red with blue eyes, VII. 1; dark, V. 2, 3, 4, 8, 9, 26, 28, 29.

N.B. There is some doubt as to the parentage of V. 10; his mother was either IV. 12 or IV. 16, but whether IV. 5 was or was not his father is uncertain; he is several years older than V. 11. (C. H. Usher.)

PLATE VI. Fig. 29. Five albinos in a sibship of eleven live births and three miscarriages. Only two albinos living; III. 14, now 49, hair white with tinge of yellow at ends of some hairs, eyebrows and lashes quite white, irides blue, pupils red, choroid pale but less so (*i.e.* more pigmented) "than hair or skin led me" (C. H. Usher) "to expect; no part so white as in many albinos"; refraction myopic, V. $\frac{1}{60}$ and 4 J. at 6 inches; lateral nystagmus 140 per minute. Health good, catamenia always regular, stature rather below average; married at age of 25 but has had neither children nor miscarriages; husband four years her senior, strong and healthy with brown hair and blue eyes. III. 15, aged 48, unmarried, good health, tall, fairly intelligent (messenger); hair, eyebrows and lashes quite white; skin fair but does not blister or chafe more than other people's; irides blue, pupils red, choroids not so markedly white as in many albinos; refraction myopic, V. $\frac{2}{60}$; lateral nystagmus 94 per minute. Of the other albinos, III. 6, with very fair hair, blue eyes, red pupils, nystagmus and bad sight, died at 17 months from measles; 7 resembled the others and died unmarried at 51 of pneumonia after influenza; 9, an albino like the others, died at 2½ years, cause unknown. Of the others, III. 10, 11, 13 and 16 are living and all have dark brown hair and blue eyes; III. 5, dark, died at 30 of "heart," and 8, dark, died in infancy; III. 12, three miscarriages between 11 and 13. Parents (II. 3 and 9) first cousins, no other cousin marriage in the whole family; father (II. 3), light brown hair, blue eyes, was third of four, the others had brown hair; married at 30 to II. 9, dark brown hair, blue eyes, aged 17. She (mother, II. 9) attributed her children's albinism to having seen two albinos at a show when pregnant with III. 6; all her children were born at full time and her health good whilst child-bearing; she was fifth born of nineteen born alive, of whom she and 15 and 20 are in correct order of birth, but the order of the others is unknown; six (*i.e.* three pairs) of the nineteen were twins; no information as to miscarriages; hair- and eye-colour not known, except 15 and 20, both dark brown hair and blue eyes. Hair- and eye-colour of others: III. 1 to 4 all blue eyes, 2 had red hair, the others dark or black, 17 to 27 all said to have blue eyes and more or less dark hair, none fair; in IV. and V. all except IV. 7 (including husbands of IV. 6, 9, 10, 14) blue eyes; hair yellow or light yellow in IV. 3 and eight of V. 3 to 16; fair-red in IV. 3 and 9 and the husband of III. 11 and several of IV. 4 to 16. Of the twins in IV., IV. 9 fair-red hair and blue eyes, 8 had dark hair and eyes and died at 16 months old; IV. 10 blue eyes, light brown hair, 11 died six days old, blue eyes and light brown hair. (C. H. Usher.)

Fig. 30. Three complete albinos in a large pedigree; first (III. 2) and second (IV. 3) father and son, third (III. 10) no relation to first but first cousin once removed, through mother (III. 17), to second (IV. 3). III. 2 had white hair, "blue" eyes, red pupils and weak sight, and was "just a picture" of his albinotic son (IV. 3), an illegitimate child by a black-haired and brown-eyed woman (III. 17), who, however, had an albinotic first cousin (III. 10); III. 2 had also a legitimate family (IV. 2) of whom nothing is known; he died of consumption. IV. 3, now (1905) aged 35, healthy looking, rather tall, well developed, intelligent, good memory, is a complete albino; hair, eyebrows and lashes quite white, moustache slightly tobacco stained, otherwise white; skin not irritable or tender, but he feels the cold more than others; pupils red, lateral nystagmus 112 per minute; V. right $\frac{1}{60}$, left $\frac{3}{60}$, refraction myopic; fundi very albinotic. Was born normally at full time; he is married (no particulars of his wife noted) and has had four children (V. 1 to 4), second died at two years, had auburn hair and brown eyes; V. 1, aged 8, has blue eyes and light brown hair; 3, aged 4, brown eyes and light brown hair; 4, aged 2, eyes not blue, hair light brown; in all three the fundus (choroid) well pigmented, but the skin very fair. III. 10 had quite white hair, red, moving eyes and short sight, and died at 19, cause unknown. Hair- and eye-colour of others: eyes blue and hair light brown in II. 9 and 16, III. 4, 9, most of the eight children (not shown) of II. 11, V. 1; hair nearly white, but eyes steady and sight good, in II. 2 and III. 1, *these might have been shown as semi-albinos*; hair red or reddish and eyes blue, I. 4 and 6, some of III. 14, and some of their children in IV. (not shown), III. 16; dark or black hair and eyes, II. 10 to 18 (except 16), III. 5, 6, 7, 8, 17, 18, 19, 22, 23, IV. 5 (five of the seven), four children (not shown) of II. 16; and the majority of the others whose eye-colour is not given had brown, dark or black hair. Amongst the issue of III. 1, two were twins, both of them deaf-mutes. Though not bearing upon the albinism in this family the occurrence of mental defects may be noted in I. 5 and his descendants; I. 5, a minister, had epileptic fits which prevented him from preaching; one of his fifteen children (II. 15) committed suicide and one of his five, a son (not shown in III.), is in an asylum; of the four children of II. 16 (not shown), one male is "silly" and another, female, a lunatic; of the ten children born alive of II. 18 (III. 16 to 27), III. 18 is in an asylum, 25 and 26 had epileptic fits. The twenty pregnancies

III. 16 to 27 occurred in 28 years and there were no twins. III. 17 had normal children by two husbands, III. 17 A and 17 B besides her illegitimate albino son IV. 3. *The footnote to this figure must be cancelled as erroneous.* (C. H. Usher.)

Fig. 31. Three complete albinos, sister, brother and cousin (V. 8, 10 and 16). V. 8, aged 45, unmarried, tall, healthy, catamenia normal, well educated, good linguist and vivacious talker, teeth good, hair white, slightly yellow at ends, brows and lashes white, skin blond, iris gray and translucent, pupils red, fundus typically albinotic and optic disc darker than choroid, lateral nystagmus 108 per minute, refraction myopic, V. $\frac{2}{80}$ and 1 J. slowly. She and the next born at full time and mother's health good during pregnancy. V. 10, aged 42, tall and strong, but of irritable nature; skin tender and easily chafes; very intolerant of strong light; completely albinotic, and the description of his sister applies word for word to his condition, except that his moustache is yellow from smoking and the ends of his scalp-hair not yellow probably because he keeps it short; refraction mixed astigmatism, V. $\frac{4}{80}$ and 6 J. at 5 inches. V. 16 was an albino who died at seven years old from heart disease following rheumatic fever. All the siblings of the three albinos had blue eyes and fairish hair but none conspicuously fair. Mother (IV. 8), blue eyes and brown hair, aged 28 when married; father (IV. 7), red hair, aged 32 at marriage; mother (IV. 12), blue eyes and brown hair; father (12 A), nothing known of complexion, &c. Hair- and eye-colour of others: hair more or less fair and eyes blue, III. 11, 12, 13, 15, 16, 20 (red hair); IV. 9 had "very fair hair indeed" and blue eyes, but good sight, *and might have been marked as a semi-albino*, she died of consumption at 22; dark, III. 10 and 14 "very dark like a gipsy"; III. 17, 18 and 19 and III. 1 to 9 and their descendants more or less dark, none fair. Never any cousin marriages, but I. 1 and 2 had the same name—a common name in their district—lived near together and may have been remotely connected. (C. H. Usher.)

PLATE VII. Fig. 32. One albino out of two, the other sibling (II. 2) having fair hair, both the parents (I. 1 and 2) fair hair and the father certainly blue eyes (eye-colour of I. 2 and II. 2 not noted). The albinism in II. 1 is complete; she is 34 (1906), married and has one child (III. 1) with sandy hair and blue eyes; the two children of II. 2 show no peculiarity. Albinism attributed by mother (I. 2) to impression made, whilst pregnant with II. 1, by speaking with a relative about an albino girl whose funeral the relative had just been attending. (Mr Snowball, Case 5.)

Fig. 33. One albino in sibship of two; albinism (III. 2) complete with nystagmus and signs of defective vision, aged 2 (1906). The sibling (III. 1), aged 6, blue eyes and rather light hair (not conspicuously so). A 1st cousin (III. 3) has unusually light hair and blue eyes. Hair- and eye-colour of others: mother (II. 4), medium hair, blue eyes; of her nine siblings (II. 5, 6, 7), seven medium hair, two dark; mother's father (I. 3), dark hair, blue eyes, his wife (I. 4) resembles II. 4; father (II. 3), dark hair, blue eyes; he has one sister (II. 2) fair and six brothers all dark (II. 1); none of the children of II. 1 and 2 are albinos. (Mr Snowball, Case 6.)

Fig. 34. One pronounced albino (IV. 2) in five; he is 15, with high myopic astigmatism, M. 12 D. up-out, 8 D. up-in. Of his four siblings 3 and 4 died at a week old, eyes not pink; 1, aged 17, has very light hair; 5, aged 10, ginger or sandy hair and blue eyes. Father (III. 1) was moderately fair; his family believed to be dark. Mother (III. 2) rather fair hair, gray-blue eyes. Of the remainder, I. 1 said to have been fair haired, II. 2 decidedly fair, III. 6 very fair hair, nearly white brows and blue eyes, III. 5, now dead, very fair and probably myopic, IV. 6 sandy hair. (Mr Snowball, Case 7.)

Fig. 35. Two albinos in a sibship of six; III. 3, completely albinotic man, aged 40 (1906), intelligence and health ordinary, outdoor occupation; III. 2, his elder sister, 45, eyes light blue, nystagmus, defective vision, hair now light brown; III. 1, aged 50, 4, 36 and 5, 30 years, all dark and healthy, 6 died of "croup" at nine months. Father (II. 5) married at 21; he and both his parents dark. Mother (II. 2) married at 22, dark, the second of four, died at 49, cause not given, had no miscarriages or still births; some of her siblings were dark, none specially fair; III. 1 and 4 died at 50 and 36, the latter of chronic Bright's disease. I. 1 and 2 both dark and lived to 80 and 70 respectively. (Mr J. Burdon Cooper.)

Fig. 36. One complete albino (III. 2) in a sibship of five, all with blue eyes and all except III. 1 light hair. III. 2, young adult but exact age not given, hair almost white, vision defective, nystagmus and jerky movements of head, irides dull blue, pupils said to be not pink¹. Mother (II. 3) and II. 1 and 2 all blue eyes and fair or lightish hair. I. 1 (Dutch) fair hair. I. 2 (English) and her youngest child (II. 6) dark. (Dr F. W. Marlow, Syracuse, U.S.A.)

Fig. 37. Two complete albinos in sibship of five. III. 3, aged 17 (1906), hair quite white, irides grayish blue, pupils red, slow lateral nystagmus, intolerance of light, especially left eye; born full time, tall, strong, well-proportioned, intelligent and has passed several good examinations. III. 7, complete albino, aged 1 year (1906), white hair, pinkish gray irides, lateral nystagmus, likes to shade left eye; fine healthy baby. The siblings (III. 4, 5, 6) all blue eyes and light hair. Father (II. 3), 47, married at 29, hair formerly golden, now light brown, eyes light blue, clever but extremely neurotic, well educated. Mother (II. 4), aged 38, married at 20, light brown hair, light gray-blue eyes, healthy and not at all neurotic. III. 2, aged 20, very fair; no information as to hair- and eye-colour of the rest, but certainly none

¹ Circumstances not favourable to observation on this point.

albinotic; II. 3 born in England, II. 4 born in Natal. Mother, no miscarriages or still births, and all her children born at full time; her health good whilst childbearing. III. 6, light brown hair, dark blue eyes, died at five years old of enteritis; was born four years before III. 7. (Dr Chas. Ward, Pietermaritzburg.)

Fig. 38. Three albinos and several normal siblings of both sexes in a pure Zulu family. II. 3, aged 20 (1906), a well-built, intelligent Zulu, has white, woolly hair, pink skin with no dark spots, grayish blue irides (pupils not mentioned) and lateral nystagmus, reads with glasses, see Plate AA. His two older brothers said to be albinos, the younger siblings, *number unrecorded* (II. 4 and 5) normal. Never heard of albinos in his ancestors. His eyes water in the sun, and skin is inclined to crack but shows no pigment spots. (Dr Chas. Ward.)

Fig. 39. Eleven albinos in a rather extensive pedigree. Of the seven in a sibship of sixteen in Gen. IV., two (2 and 4) died at 22 of phthisis, the other five are living. No exact details of vision obtainable, but they are all well known for their golden-white hair, pink pupils and lightish blue irides and defective sight, and several are known to have oscillating eyes. All born at full time. None are married. They are of the farm-labourer class. Of the nine others of this sibship one (13) died of phthisis, 11 and 16 were miscarriages; the living ones have brown hair and eyes. Several of the normal ones have large families (V. 1 to 26), amongst whom none are albinos, but six have died, probably of phthisis. The mother (III. 2) has brown hair and eyes, health good during all her childbearing; her siblings (III. 3 and 4) and their issue not fair. Father (III. 1) healthy, hair- and eye-colour not noted. Mother's mother (II. 1) died of heart disease at 57; her husband (II. 2) died at 30 of some brain disease; his mother (I. 1) was certainly an albino and is said by III. 2, who knew her, to have been "just like my white ones"; she had four brothers and one sister, and three of these (I. 2, 3, 4) are said by III. 2 to have been albinos. III. 3 is said to have been "born blind," but no details known. (Dr Huntley.)

Fig. 40. Two partial albinos in a sibship of nine. IV. 4, aged 13, iris blue gray, hair light russet-brown, eyebrows and lashes (?) rather darker than hair, choroid very deficient in pigment, especially in lower half of each eye, refraction H. As. 4 D. horizontal, marked nystagmus. IV. 5, aged 10, iris light slaty blue, red reflex in daylight, choroid markedly albinotic, skin fair, hair, brows and lashes a dull tint of light brown, V. $\frac{4}{80}$, refraction M. As. 5 D. vertical. Mother (III. 4), "black" eyes and dark complexion; father (II. 3), aged 44, was rather fair, hair now gray, eyes blue; they are niece and uncle. Hair- and eye-colour not known in I., II. and III. (except parents of albinos); IV. 3 and 7 blue eyes, IV. 2 and 6 dark. IV. 1, three boys born 24, 22 and 20 years ago and died at five years, one week and one week (IV. 2 is now 17 and IV. 7, 3 years old). No miscarriages or still births. Mother's health good throughout. (Dr Ernest Jones.)

Fig. 41. Complete albinism in an only child (IV. 1), now (1906) aged 5. Mother, aged 28 at child's birth, is and always has been dark; health good during pregnancy, child born two weeks before time; no other conception; mother is first born of 12, of which the six, III. 1 to 6, are dark or very dark, 7 to 12 all fair; the children (IV. 2 to 6) of her dark siblings (III. 2, 3, 4) are dark and fair in about equal numbers. Father (III. 13), aged 29 at child's birth, gray eyes and hair originally "tow-coloured," now darker, was born with left arm defective, ending in a stump below elbow. He has three siblings, III. 14 tow-coloured hair, 15 very fair, 16 dark has three children (IV. 7, 8, 9) all medium or light brown. II. 1 "swarthy," II. 3 fair with light brown hair, II. 4 dark, II. 5 dark, died of diabetes at 40. I. 1 fair, I. 2 dark, I. 3 fair, I. 4 dark, I. 5 dark, I. 6 fair. II. 2, a first cousin of 3, had cleft palate. A single black hair has been found on the albino's head. (Mr Percy Flemming.)

Fig. 42. Complete albinism in one of seven children (II. 1), now aged about 28 (1906); V. $\frac{6}{34}$. II. 2 was dark and died at 15; interval between 1 and 2 not known. II. 3 to 7 all stillborn or died very early; some were extremely fair or albinotic, the rest very dark; (another statement is that all these five were albinos.) I. 1, mother, darkish brown hair; I. 2, father, no information. (Mr Percy Flemming.)

PLATE VIII. Fig. 43. Five complete albinos in a sibship of ten. VI. 4, aged 43, a clergyman, completely albinotic with white hair, eyebrows and lashes, irides pale gray and translucent at periphery, pupils (undilated) sometimes red in daylight, fundus albinotic but somewhat less so than was expected, no marked intolerance of light; rather slow lateral nystagmus; refraction high mixed As., M. 3 D. vertical, H. 3 D. horizontal, V. with and without correction $\frac{6}{36}$, reading improved by cylinders. Unaided reads 8 J. at eight inches, and on trying to read it at greater distance he at once began to rotate his head; an observer (E. N.) could not tell whether this was compensatory to the nystagmus, but it was certainly at about the same rate; no head movement in reading at his chosen distance nor when looking far away. VI. 4 said that one of his albinotic sisters *always* shakes both her head and her eyes, and that in another of the albinos the nystagmus is rotatory, "not sideways like mine." Mr Herbert Fisher saw VI. 5 in 1903 and found complete albinism, nystagmus and high M. (10 to 11 D.) with slight astigmatism, V. corrected $\frac{5}{36}$; fundi showed small myopic crescents. The others (VI. 2, 3 and 7) described as completely albinotic. The non-albinotic siblings (VI. 1, 6, 8, 9, 10) have blue eyes and brown hair. Nine of the ten are living, VI. 6 died of diabetes at 6½ years. VI. 1 has three children; VII. 1 died at two weeks; 2, aged 11 years, has fair golden

¹ Albinos with exceptionally bad sight are sometimes placed in Schools for the Blind.

hair and blue eyes; 3, aged one year, no particulars; no details of wife of VI. 1. VI. 4 has three children; VII. 4, aged 10 years, brown hair, greenish-brown eyes; 5, aged $8\frac{1}{2}$, golden hair, blue eyes; 6, aged 7, *hair was nearly white at first*, now light brown, eyes blue; wife of VI. 4, fair brown hair, blue eyes, she and her husband not cousins. VI. 10, married 12 years, no issue. The sibship VI. 1 to 10 born between 1860 and 1874; intervals longest between 5, 6, 7 and 8. Mother of albinos (V. 1), auburn hair, blue eyes, all her children born at full time; her only sibling (V. 2) had fair hair, bore marked likeness to VI. 4 and died at 21. Hair- and eye-colour of others: Gens. I., II., III. and many of V., no information; fair, IV. 2; dark, IV. 3. (Mr Fisher, Sir H. R. Swanzy and E. Nettleship.)

Fig. 44. Three complete albinos (IV. 3, 7, 8) in a sibship of seven born alive and two miscarriages, IV. 5 and 11, *the latter not so marked on diagram*. IV. 3, aged 45 (1906), a highly intelligent clerk, perfectly normal except the albinism; skin easily blisters from sun-heat, hair, brows and lashes white, irides translucent, pupils red, fundus extremely albinotic, the choroidal vessels being all exposed even in the yellow-spot region, which is probably explained by myopic stretching; myopic crescent; rather slow, lateral nystagmus. Refraction very high As. and considerable myopia, the figures being about 15 D. M. vertical and about 8 D. horizontal, V. $\frac{6}{80}$ with correction; reads small print with weaker glasses. IV. 7, aged 38, and 8, aged 36, reported to be as albinotic as IV. 3. IV. 4 (who died of scarlet fever at 12), 6, 9, 10 all dark brown hair, eyes dark blue in 4 and 10, brown in 6 and 9. Mother (III. 4), now 70, hair very dark brown, eyes dark blue; she was first born of 13, all with dark hair, only one other now living (III. 5), aged 57. Father (III. 1), now 67, dark brown hair and brown eyes, first born of three, the others (III. 2 and 3) having also dark hair and brown eyes. None in Gens. I. and II. really fair; II. 1 light brown hair and gray eyes, II. 2 light brown hair and brown eyes, II. 3 dark hair and blue eyes, II. 4 very dark hair and gray eyes, I. 1 to 4 all dark hair and eyes. Health of albinos' mother (III. 4) good whilst child-bearing, and none of her children born alive were premature. Two albinos are married; IV. 3 to IV. 1, one year his senior with dark brown hair, gray eyes, two children aged 17 and 12 (V. 1 and 2), brown hair and blue eyes; IV. 1 was seventh of nine, both her parents dark or black hair, gray or blue eyes, and not consanguineous: IV. 7 to IV. 15, same age as her husband (38 years), dark hair, brown eyes, two children, aged nine and three (V. 4 and 5), brown hair and blue or gray irides; IV. 15 was second of two, her elder (brother) having black hair and dark eyes. (Mr Hartridge.)

Fig. 45. Three albinos in an extensive pedigree, the majority of relatives were fair and several semi-albinotic. IV. 11, aged 44 (1905), an able professional man, but spells extremely badly; was well known as an albino to his fellow-students; sandy hair and beard (samples kept), white eyebrows and lashes, nystagmus, high H. As., V. corrected $\frac{6}{24}$. IV. 7, a complete albino with red pupils and bad sight was idiotic, much undergrown, had infantile paralysis from the age of nine months, and died at 17. IV. 8 and 9, both fair, 10 a miscarriage. IV. 7 to 11, born between 1853 and 1861. I. 3, born 1754, had very fair hair and is known to have worn strong convex spectacles constantly (+4 D.); of his twelve children nine were certainly fair, one (II. 9), very fair with red hair, married a dark haired man (15) and had one semi-albinotic (III. 9), one fair (III. 11) and two dark children; another (II. 8) had a "very fair" daughter (III. 5), mother of the albinos and two others, one fair. III. 9 had three children all fair (IV. 12 to 14), and two of these have each a fair child (V. 5 and 6). In the entire pedigree those known to be dark are II. 1 and 2, both very dark with Jewish features; II. 5, 6, 7; II. 15 and 17; III. 8 and 10; III. 12 (of French origin); IV. 1, 2, 3, 4, 5; IV. 17, 19, 20; and IV. 23. Almost all the others either fair or red haired and fair skin. (Mr Holmes Spicer and Dr Lyndon.)

Fig. 46. One *partial* albino¹, V. 4, born with white hair and eyelashes, seen at four years old with very fair hair, blue, but not translucent, irides, black pupils, but choroids very pale, nystagmus, myopic astigmatism. When 16 hair medium shade of brown; irides, nystagmus and V. as before, compound My. As. about 5.5 D. M. nearly vertical, 2 D. M. nearly horizontal (refraction not exactly alike in the two eyes), V. $\frac{6}{18}$ barely; fundus very pale as before, colour vision normal. Mother (IV. 1), brown hair and blue eyes. Father (IV. 2), dark hair and blue eyes, markedly colour-blind (he inherits this from his mother, III. 6—see *Trans. Oph. Soc.* xxvi. 253, 1906). Of the earlier generations III. 1 had red hair and blue eyes, his wife (not shown) dark hair and blue eyes; III. 1 was the third of a large childship (not shown), all of whom grew up and all had blue eyes; III. 2 had light hair and blue eyes; II. 4 had fair golden hair and fair complexion; II. 7 was one of twins, the other died. The albino (V. 4) is the youngest of four; V. 1, born about seven years before 4, brown hair, fair skin, blue eyes, hair said to have been fair in childhood; 2 goldy brown hair, blue eyes, hair said to have been fair in childhood; 3 still-born. (Mr Leslie Paton and E. Nettleship.)

PLATE IX. Fig. 47. Five complete albinos (III. 6, &c.) in a sibship of twelve born alive and four miscarriages; the four female albinos living and aged 25, 17, 15, 9, intelligent and active, all with white hair till puberty, after which it becomes a light yellowish; pink pupils, very pale blue irides and hypermetropic astigmatism, nystagmus and in III. 10 and 12 constant head shaking, which seems to be compensatory to the nystagmus. III. 13, male albino, died at 8 years old with a very large goitre, full albinism, defective sight and marked photophobia. The seven non-albinotic siblings all have blue eyes, except III. 8, gray eyes; four of them, 2, 7, 9 and 16 have yellowish ("ginger") hair; three, 1, 4 and 8, brown hair. The

¹ Engraver's slip on plate escaped correction.

ages vary from 32 (III. 1) to 7 (III. 16) and the intervals are about equal throughout. Mother (II. 2), hair light ginger (yellowish or sandy); her father (I. 3) was "ginger," her mother (I. 4) dark. Father (II. 1) sandy red hair; his father and mother (I. 1 and 2) dark. History well known and no albinos ever heard of in collaterals of either I. 1 to 4 or II. 1 and 2. No family history of goitre. Mother attributes albinism to her having met, on her way to market when three months pregnant with III. 6, a man who, not himself an albino, had to her knowledge two albino children. (Dr Dudgeon.)

Fig. 48. Albinism of *skin and hair only*, without known defect of sight¹, in several members of three generations. IV. 8, aged 31, an inmate of Colney Hatch Asylum with suicidal tendencies and various delusions; physically fairly strong; skin quite white all over but exposed parts readily tan from the sun, pityriasis versicolor on chest and back (microscopical examination), hair of head, face, body and limbs white, eyebrows nearly white, eyelashes sandy brown, a few sandy hairs intermingled on face and pubes, irides slaty blue with a few specks of yellow, no nystagmus, pupils black, no photophobia, fundus not light, choroidal vessels not being visible anywhere, considerable myopia (about 6 D., but result of trial with glasses unsatisfactory, probably owing to his mental state, not much astigmatism, reads very small print held rather close). He is youngest of eight, of whom the two first (IV. 1 and 2) were born of the same parents before marriage, one of these two still living is dark (Dr Mott saw him); three (IV. 3, 4, 5) died very early, their places in the childhood not known but presumably between 6, 7 and 8. III. 6 and 7, aged 43 and 37, are reported by the Asylum Officers who have seen them to be in colour of hair, &c. exactly like IV. 8. Mother (III. 6) was not fair. Father (III. 5), aged 77, eyes blue, hair was always very fair and has latterly become quite white, sight good, no nystagmus; is youngest of four, III. 2 was very dark, III. 3 and 4 very fair like himself, all grew up but none married. Father of III. 5 (II. 3) "as dark as a raven"; mother (II. 2) fair hair, and she had a brother (II. 1) with white or very light hair; his son (III. 1) quite dark. I. 3 said to have been light. III. 5 is intelligent and talkative, a carpenter, but neither he nor his albinotic sons have ever held long to steady work. (Dr F. W. Mott and Dr Seward.)

Fig. 49. Two complete albinos (IV. 2 and 3) in a sibship of four. IV. 2, aged 22 (1905), absolutely white skin and hair and albinotic fundus. IV. 3, aged 20, said to be similarly affected; IV. 4, aged 15, and 5, aged 12, black hair, brown iris, yellowish skin (parents Russian Jews living at Cairo for the last 20 years). I. 2, a Russian or Roumanian Jewess, had white hair and "light green" eyes. All the others dark. (Dr Meyerhof, Cairo.)

Fig. 50. One full and one incomplete albino (IV. 7 and 9) in a sibship of nine. IV. 7, aged 5 (1906), white hair, light blue iris, nystagmus, "a marked albino"; IV. 9, aged 14 months, eyes blue, hair very nearly white. IV. 1, very fair hair, gray eyes; 2, "whitish" hair, blue eyes; 3, light hair, dark eyes; 4 had blue eyes, died at a few months; 5, light brown hair, blue-gray eyes; 6 had light brown hair and blue eyes, died at six months; 8, golden hair, blue eyes; their ages are from 15 years to 14 months, with nearly equal intervals. Mother (III. 2), fair hair, blue gray eyes. Father (III. 1), brown hair, blue eyes. II. 2 and 3, brown hair, blue eyes. I. 1 and 2 had blue eyes. II. 1, dark hair, brown eyes. II. 4, said to have had black eyes and fair hair (?senile). (Mr Rowan.)

Fig. 51. Extremely fair, or almost white, hair in many members but no albinism of eyes. All those marked as semi-albinotic (except III. 6, see below) are very conspicuously fair, and most of the others have degrees of fair hair and blue eyes. The only dark ones are III. 3, very dark hair and eyes, and some of his eleven children, the others being fair, IV. 2 extremely so, and III. 9, dark hair and eyes, also her second child (IV. 6), IV. 5 having nearly white and 7 rather fair hair. III. 6 and IV. 5, 8 and 9 have been examined. III. 6 is peculiar in having had all her life as the only sign of albinism a tuft of nearly white hair on her right temple, hair medium brown, eyes brown. IV. 13, aged about 24 (1906), was operated upon for congenital (lamellar) cataracts when about 10 (1882). (E. Nettleship.)

Fig. 52. The albino II. 1, now 43 (1906), had a non-albinotic twin sibling that died. Father (I. 2) had light hair and his brother (1) probably sandy; hair- and eye-colour of mother (I. 3) not known. (Dr Crowe, Case 1.)

Fig. 53. Complete albino with nystagmus (IV. 2), aged 9 months (1906), born about a year after IV. 1. Mother (III. 1), brown hair, light blue eyes. Father (III. 2), dark hair, blue eyes, fair skin; had a red-haired brother (III. 3) and sandy-haired sister (III. 4). I. 1 died in an asylum; III. 3 is (1906) in an asylum and 4 is mentally deficient. IV. 1 and 2, born at full time, no miscarriages, both parents aged 21 when married and 23 at birth of IV. 2; health of mother (III. 1) good throughout. (Dr Crowe, Case 2.)

Fig. 54. One undoubted albino (III. 2) and probably another (II. 8). III. 2, aged 2½ years (1906), very light flaxen hair, light blue or gray irides, red pupils, albinotic fundus, nystagmus, photophobia, refraction simple H. 2 D. Father (II. 8), now 27, born with white hair and is still very fair; no information as to his sight; all his eight siblings very fair; the three brothers (II. 2, 3 and 9) died in infancy; three of the five sisters living. Mother (II. 10), aged 23, married at about 18, dark and healthy, is the first born of ten, all of whom and the parents (not shown) were dark. Of the albino's siblings III. 1, aged four years, fair hair, light brown eyes, no nystagmus; III. 3 died at eight months;

¹ Should have been marked incomplete on plate.

all born at full time and no miscarriages. I. 1 was dark, I. 2 fair like her children. It is noteworthy that I. 1 was 44 and I. 2 only 19 when they married, that II. 1 to 7 were born at the rate of one every year, but that II. 8 was not born until seven years after 7, and when the father was 60. (Mr Blair.)

Fig. 55. Two almost completely albinotic sisters, sole issue of somewhat less completely albinotic mother and rather dark father, who were first consins. III. 1, aged 27 (1906), straw-coloured hair, pale gray irides, fundus pale but not entirely albinotic in character, nystagmus, M. 10 D. III. 2, aged 25, hair, irides, nystagmus and refraction like II. 1, but suffers from detachment of retina in both eyes. Mother (II. 6) very fair hair like her daughters, blue eyes and somewhat imperfect sight; her two living sisters (II. 7 and 8) and father (I. 2) all have fair hair but good sight. I. 1 was dark. Father (II. 5), rather dark hair, is one of 16, four brothers and three sisters living; none of the 16 had markedly fair hair. (Dr E. J. Smyth.)

Fig. 56. One complete and one partial albino (III. 6 and 7) out of nine, all born at full time, during about 13 years at fairly equal intervals. III. 6, aged six (1906), white hair and was white at birth, gray-white irides, red pupils, nystagmus; did not open his eyes for some days after birth. III. 7, aged four, very fair hair and blue irides, no nystagmus. All the siblings of III. 6 and 7 have or had blue eyes and fair hair; in all except III. 6 the hair was dark brown at birth and turned light later, and this process (the normal one in light-haired children) was going on in III. 9 when seen at three months old (Nov. 1906). Of the nine, four are dead, III. 1 and 3 each at 10½ of measles, 2 at 2½ bronchitis, and 8 at 14 months. Mother (II. 6) married at 19, now 33, blue eyes and brown hair. Father (II. 1), aged 37, about 23 at marriage, blue eyes and fair hair, is first born of twelve, of whom the three next to him and three others are living, five dead. Hair- and eye-colour in others: fair in I. 1, 3 (very fair), 4, II. 9, very fair; hair dark brown, eyes blue, II. 7, 8, 10; dark, I. 2, 5, two out of II. 1 to 4, the rest (except II. 1) being "between colours." (Mr Malcolm Hepburn.)

PLATE X. Fig. 57. Three complete albinos in a sibship of nine, varying in age from 39 to about 25, one of them (IX. 20) a twin. IX. 16, aged 36, hair quite white everywhere (body stripped); 2½ inches down-out from left nipple, "a brown mole, two-thirds of an inch long, with brown hairs on it"; a wart on left side of back and another over the supinators of left arm. Several large scars on the limbs with history of dead bone, also history of "white swelling" of left knee when 15; all these doubtless tubercular; is now quite strong; iris blue, pupils red, fundi very pale except yellow spot area, discs rather darker than choroid, refraction in R. moderate mixed As., in L. M. As. 2 D. vertical; V. corrected $\frac{6}{38}$; colour vision normal; lateral nystagmus 116; tall, strong, healthy, fond of music and reads it. IX. 20 would now be 29, the younger of twins; died at 24 of consumption, was completely albinotic like 16. The elder twin, IX. 19, aged 29, brown hair and eyes; has three children, of whom the eldest (X. 12) has light brown hair, the other two dark brown. IX. 22, an albino who died at 15 months of convulsions; had "moving eyes" and quite white hair. Of the normal siblings in IX. 14 to 22, hair brown or dark brown and eyes blue in 15 and 18, hair dark brown and eyes brown in 14, 17, 19 (*supra*), 21. Of their children in Gen. X. the five marked semi-albinotic have blue eyes and fair hair, X. 15, aged three months, dark hair and blue eyes; the rest of X. 3 to 15, brown eyes and darker hair. Father (VIII. 10), black hair, brown eyes, aged 70. Mother (VIII. 18) had brown hair, light blue eyes and "very near sight," but eyes said to have been steady; was very hysterical; she was the only fair one, VIII. 17 and 21 being black haired, 19 and 20 medium and reddish brown. Hair- and eye-colour in others: VIII. 25 and 26, both very fair; VIII. 24, fair, but died young; of the others from Gen. VII. downwards, X. 1 and 2 (young children), blue eyes and fair hair; brown hair with blue eyes prevailed in VII. 5 to 9; none of the others in VII. VIII. IX. or X. were known to be fair and many, especially VII. 1 to 4 and 14 to 17, were quite dark; no albinism ever heard of before Gen. IX. IX. 8 and 9, two deaf-mute brothers, aged more than 30, with advanced retinitis pigmentosa, sight failing since 13; they have four sisters all unaffected; no information as to their father. (C. H. Usher.)

Fig. 58. Four albinos in a sibship of twelve. II. 4, aged 19 (1905), an albino with no other defect in her eyes or elsewhere. II. 5 and 7, both died immediately after birth. II. 12, an eight months' child, also died when a few hours old. All the others are living and are all reported to have dark hair and dark blue eyes. Mother (I. 2) and her siblings (I. 1), dark hair and dark blue eyes. Father (I. 3) and his siblings all dark hair and dark brown eyes. No defects known on either side. (Mr Cecil Shaw, Case 1.)

Fig. 59. A sibship of thirteen (III. 3 to 15), aged from 32 to 13, containing three albinos, one congenital deformity of toes, and twins. III. 7, aged 26, 9, aged 21, and 14, aged 13, marked albinos with very defective vision; of the others, III. 10 had fair hair and blue eyes and died at 2½ years of "water on the brain"; 13, the younger twin, was very fair and died at six months; 15, very fair, died at eight months. Eyes more or less blue or gray in III. 5, 6, and 12; the others had brown hair and eyes, 3, 6, 8, 11 and 12 (the elder twin) very dark hair. III. 5 has no toes on right foot and only one large one on left. Mother (II. 6), the youngest of thirteen¹, exceedingly dark, as are most of her siblings. II. 14, a very dark cousin of II. 6 who has at least two albino children III. 22 and 23; they and their parents are in Australia. Father (II. 3), light brown hair and blue eyes; he is third born of eight, some of whom (II. 1 and 2) have children (III. 1 and 2). (Mr Cecil Shaw, Case 2.)

PLATE XI. Fig. 60. Four albinos in a sibship of 11 (IV. 5 to 15). IV. 5 died at three months and IV. 12

¹ In pedigree a wavy line should have appeared under this sibship.

at three years, the latter from diphtheria. IV. 11, aged 52 (1905), an educated professional man; hair distinctly tinged with yellow, brows and lashes the same, body hair not quite white; eyes blue, slight red reflex from pupils with difficulty, lateral nystagmus about 70 and not always present; much more rapid when one eye is closed and was worse in childhood; refraction M., V. with his concave glasses $\frac{4}{80}$; fundus very light even at yellow-spot region, a congenital crescent in each; tall, robust, good abilities, was usually top of his class of 30 at school; his wife dark hair and eyes; their four children medium-coloured hair and two at least have dark choroids. IV. 14, aged 45, albinism of exactly same degree both as to skin, hair and eyes, as 11; refraction M. and V. with his concave glasses $\frac{4}{36}$; taller than 11 and not so intellectual; wife dark hair and medium eyes; one son (V. 7), aged nine, brown hair, blue eyes, choroid decidedly light; no miscarriages. In regard to both the above, the irides do not now transmit red light, and only a slight redness is visible in the pupils, but their mother says the pupils were red in childhood; "the choroids are more albinotic than the colour of the hair led me to expect" (C. H. Usher). Mother attributes the albinism to having, when pregnant, looked at a waiter with moving eyes and white hair; no miscarriages in IV. 5 to 15. The siblings of the albinos (IV. 6, &c.) are dark or medium, none fair; no prevalence of fairness in V. except the two children (V. 8) of IV. 15, who are fair, but their mother is fair. Mother (III. 31), aged 88 (1905), medium eyes, gray hair. Father (III. 5) was "fair but not white," lived to 84. III. 19 "was white just like" IV. 14, but had good sight; III. 16, 17 and 18 also very light. II. 8, 9, 10 all had very light or white hair, no information about their sight. II. 19 and 21, very fair, and their mother (I. 5) believed to have had light yellow hair; her husband's complexion not known. II. 14, five sisters of II. 15, reported to have all worn wigs and may therefore have had peculiar colour of hair. Hair- and eye-colour of others: hair medium shade or no conspicuous colour, II. 1 to 6, III. 2 to 7 (except 5, *supra*) and most of their descendants IV. 1 to 4, also several children of III. 2 and 3 and 27 to 34 *not shown in Fig.*; fair or light, III. 16, 17, 18, 30, a few of the children of III. 27 to 34 *not shown in Fig.*; medium or dark hair with blue eyes, III. 27, 29; dark or very dark hair, II. 7, 11, 12, 13, 15, 16, 17, 18, 20, 22, 23, 24, III. 20, 21, several children of III. 27 to 34 *not shown in Fig.* In this pedigree I. 1 A and 2 A were probably brothers; they had the same surname as I. 4 B, and the families A and B had lived close to each other for a very long time; we have, however, no absolute proof that 1 A and 2 A were brothers nor that any recognizable kinship existed between them and 4 B. Twins occurred twice; II. 18 (dark), 19 (very fair); 18 herself had twins (III. 22, 23), who died in infancy; III. 24 also died; 25 (medium hair) and 26 lived; children of II. 19 given above. (C. H. Usher.)

Fig. 61. Six cases of general albinism scattered in four sibships through three generations, two of them incomplete in degree; consanguinity of parentage of three of the sibships¹. Very fair and bright red hair respectively in at least two others (III. 4 and IV. 16). VII. 1, aged 7 (1907), very fair hair, bright blue eyes, nystagmus, refraction H. As. 1.5 D. horizontal, V. corrected $\frac{5}{9}$; her father (V. 31), light brown hair, gray eyes; mother (VI. 5), golden hair (formerly much lighter), blue-gray eyes. VI. 8, aged 30 (1907), is holding a responsible clerical post; seen when 14 with quick, fine horizontal nystagmus, H. As. 3 D. horizontal, V. corrected $\frac{6}{24}$, very fair hair and blue eyes; hair was almost white when a baby. Of his four siblings the second and fourth (VI. 9 and 11) died of diabetes at four and nine years of age respectively, the others living and well; all have (or had) blue eyes, the two who died fairish hair, VI. 10 and 12 dark hair: mother (V. 10), very fair (flaxen hair), one of eleven; all her ten siblings had blue or bluish eyes and several very fair hair; father, no relation, nearly black hair. VI. 15, now (1907) aged 25, seen when six with well-marked albinism and considerable M. As., R. M. 5.5 D. vertical, 1.5 D. horizontal, L. 3 D. vertical, 0.5 D. horizontal, V. corrected about $\frac{4}{36}$; now well, strong and does everything; albinism much more marked than in VI. 8; her three living siblings have hair from golden red to auburn, and eyes from blue to "olive green." Of the three others VI. 18 is mentally deficient, one of VI. 19 died quite early and two were still-born, their places not known precisely. Mother (V. 44), auburn hair and dark blue eyes, was third of eleven (the eldest (V. 42) was *male*), all but one were very fair; one sister mentally deficient. Father (V. 19), sandy hair, blue eyes, seventh of eleven (three dark, the rest fair); five living, two died mentally deficient. IV. 19 was an albino, he died a few days after marriage, no further particulars. IV. 23, living (1906), nearly 80, an albino with nystagmus and oscillating eyes, has had ten children (VI. 32 to 41) of whom five are fair; her husband (IV. 28) had black hair. IV. 26 was albinotic and known as "White X" in contradistinction to his cousin (V. 29), who was called "Black X." It has not been possible to ascertain the hair- or eye-colour of any others, except IV. 16, whose hair was so red he used to be told he had a "fire on his head," and III. 4, who had flaxen fair hair. (Mr E. Nettleship and Mr W. T. Lister.)

PLATE XII. Fig. 62. One complete albino in a sibship of nine (II. 2 to 10); no other case known in uncles, aunts or cousins (I. and II.). Father (I. 5), dark hair; mother (I. 4), flaxen hair. II. 2, aged 18 (1895), complete absence of pigment in the entire skin and hair system; irides "very dark blue," "not pink"; rapid horizontal nystagmus and sight (for reading) difficult; eyes not fully examined; no photophobia. (Mr Balmanno Squire, *The Lancet*, 1895, i. 282.)

Fig. 63. One albino (II. 3), two dark siblings with good sight (II. 1 and 2) and a fourth (II. 4) slightly astigmatic but complexion not noted. Father, French; mother, Dutch. (Trousseau, *Annales d'Oculistique*, Vol. cvii. pp. 5—12, 1892.)

¹ By a slip of engraver the *righthand* generation marks have been advanced a unit.

Fig. 64. Albino, only child (II. 1) of unrelated parents, but uncle (I. 3) albinotic. (Trousseau, *Ibid.*)

Fig. 65. Three albinos in two generations. II. 4, aged 26 (1892), pronounced albinism, with very defective vision; her youngest sibling (II. 6) and her father (I. 2) albinotic. The remaining siblings (II. 1, 2, 3, 5), dark and normal; mother (I. 1), very dark. (Trousseau, *Ibid.*)

Fig. 66. Four complete albinos (II. 1, 2, 4, 5) and one partial case (II. 7) in a sibship of seven; colour of hair and eyes in the other two (II. 3 and 6) not given. No consanguinity of parents. II. 1, aged 22 (1893), typical albino, nystagmus, V. $\frac{2.0}{10.0}$, H. As. 4 to 5 D. II. 2, aged 20, albino with nystagmus, H. As., R. 7.5 D., one chief meridian 5 D. opposite meridian, L. 5 D. and 2.5 D., V. $\frac{2.0}{10.0}$. II. 4, aged 15, complete albino with rapid nystagmus, M. As., M. 1 D. and 2.5 D., V. $\frac{2.0}{10.0}$. II. 5, pure albino, aged 11, sex not given, high H. As., 7 D. horizontal, Em. vertical, V. $\frac{2.0}{10.0}$. II. 7, aged five, has "a faulty opacity of the iris" (? iris translucent, E. N.) and slight nystagmus, refraction H. 2 or 3 D., colour of hair not given, but is said to be "not an albino." In the two normal ones (II. 3 and 6), refraction merely slight H. All alike seem to have been strong and vigorous. (Gould, *Annals of Ophthalmology*, Vol. XI. pp. 200—209, 1893.)

Fig. 67. Two children out of three albinotic. II. 1, aged 12, complete albino, nystagmus, H. As., 7 D. and 5 D., V. $\frac{2.0}{10.0}$. II. 3, aged four, albinism not quite complete, slow nystagmus, H. As. II. 2, aged ten, sex, and colour of hair and eyes not given, slight H., no As. No note of complexion of parents. (Gould, *Ibid.*)

Fig. 68. Two incomplete albinos in a sibship of nine. II. 2, aged 18 (1887), very fair skin, light flaxen hair and blue gray eyes, nystagmus, refraction H. As., 5 D. horizontal, V. corrected $\frac{6}{24}$, colour vision normal; fits in infancy, otherwise normal. II. 6, aged 13, hair and skin much less fair than 2, eyes blue-gray, nystagmus; refraction H. As., 4 D. horizontal, V. corrected $\frac{6}{18}$, colour vision normal. II. 1, 7, 8 and 9, nearly black hair and blue eyes. II. 3 died in infancy; 4 a miscarriage; 5 died of scarlet fever at five years old. No other albinos known in the family; complexion of parents (I. 1 and 2) not noted. (Lawford, *St Thomas's Hospital Reports*, XVII. p. 166, 1887.)

Fig. 69. Three albinos in a sibship of six. II. 1, aged 29 (1887), has a little colour in her hair, irides very light blue, nystagmus, refraction high H. As., 7.5 D. horizontal, 3 D. vertical, V. corrected $\frac{6}{80}$, colour vision normal, fundus healthy. II. 2, aged 27, albino, nystagmus, refraction H. 8 D. horizontal, 3.5 D. vertical, V. corrected $\frac{6}{36}$. II. 3, aged 25, school teacher, more albinotic than II. 1, nystagmus and wears "special," i.e. probably astigmatic, spectacles. II. 4, 5 and 6, aged 23 to 18, all dark hair and good sight. Mother (I. 5), second wife of father (I. 1), dark, some of her sisters (I. 6) fair. Father (I. 1) and some of his brothers (I. 3) dark, one brother (I. 2) fair haired; no note as to issue by first wife (I. 4). (Lawford, *Ibid.*)

Fig. 70. One albino (IV. 1) and one sibling with "average" complexion (IV. 2); no note whether there were other siblings. IV. 1, aged 30 (1896), clerk, "typical albino," high M., V. with -9 D. $\frac{2}{60}$. Parents (III. 1 and 2) "average" complexion. Three first cousins of mother's mother (II. 2, 3, 4) were albinos. (J. Ellis Jennings, *Amer. Journ. of Ophthalmology*, XIII. p. 13, 1896, Case 1.)

Fig. 71. One complete albino (II. 1), aged 25, a teacher, with nystagmus and very defective sight, but refraction could not be tested. Of her four siblings (II. 2 to 5), three have light hair and blue eyes, one dark hair and brown eyes. Order of birth of II. 1 to 5 not given. Father (I. 2), light hair and blue eyes; mother (I. 1), brown hair and gray eyes. (Jennings, *Ibid.*, Case 2.)

Fig. 72. Three albinos in seven births. II. 2, aged 13, sight very defective, no details. II. 1 was older and II. 3 younger, but exact places of the three in the sibship not given. Father and mother "normal" and not blood relations. (Jennings, *Ibid.*, Case 4.)

Fig. 73. Two albinos in a sibship of fourteen. II. 3, third born, aged 21 (1882), sickly and subject to many minor skin affections, completely albinotic with slight yellowness of hair on top of head and occiput, nystagmus, very poor sight ($\frac{1}{10}$ in better eye), refraction M., colour vision below normal to Stilling's and Meyer's tests but normal to Holmgren's; did not open eyes till eight weeks after birth and was supposed to be blind. II. 5, sixth born, an albino, died of whooping cough at nine months. None of twelve siblings lived; one died at $1\frac{3}{4}$ year, one at nine months, the other ten between 8 and 14 days; they are said to have had light brown hair, some blue eyes and some brown. The whole fourteen (II. 2 to 6) born from six to eight weeks before time. Mother (I. 2), "dark blond," with dark brown irides, healthy; her siblings and their descendants (I. 1, II. 1, III. 1), dark. Father (I. 3), black hair, dark gray eyes; his siblings and their descendants (I. 4, II. 7, III. 2), dark; he (I. 3) died ten years after birth of II. 3 of chronic pulmonary disease which had set in some 12 years previously, i.e. about two years or more before birth of II. 3, therefore most if not all the children were born whilst he was ill, and the intervals between births must have been very short. Author concludes that albinism is not a mere local affection, but that this case shows it to be in a high degree a general cachexy. (Mayerhausen, *Klin. Monatsblätter f. Augenheilk.* Bd. xx. 191, 1882.)

Fig. 74. Two albinos in a sibship of four. III. 2, aged 9 (1879), almost complete typical albinism with albinotic fundus, nystagmus, myopia 3 D. V. corrected $\frac{1}{5}$. III. 4, aged 5, similarly affected, refraction not given. The special point made by the author is the history that both children appeared to be quite blind

(no perception of light) till about eight months of age, when they began to notice the light¹. (Parenteau, *De la Cécité congénitale sans Lésions*, pp. 15—16. Paris, 1879.)

Fig. 75. A complicated pedigree. The eyes of II. 5, 6 and 7 are described as showing congenital want (or? deficiency, *Mangel*) of pigment, nothing being said as to the other ocular conditions nor as to colour of hair; ages 23, 18 and 12 years. II. 1, slight hare-lip; II. 4, double congenital cataract (posterior polar and lamellar); II. 8, idiot, age not stated but less than 12 years, with double over-ripe cataract. I. 1 and 2 a brother and sister with praesenile cataract; 1 well advanced at age of 47; 2 complete at or about 43. (Nolte, F., *Beitrag z. d. Lehre v. d. Erbllichkeit v. Augen-Erkrankungen*. Marburg, 1896.)

Fig. 76. Four albinos in a sibship of six; the other two (II. 5 and 6) and both parents were dark. (Lee, Wallace Dean, "The Praenatal Degeneracy of the Eye," *Ophthalmic Record*, 1900, p. 433.)

Fig. 77. Three albinos in a sibship of four, offspring of first cousins. II. 1 and 2 twins, both albinos, lived only forty-eight hours; II. 3 another albino that lived a year; II. 4 a normally pigmented child living and healthy. (Goux's Case: Boudin, *An. d'Hygiene*, 2nd Ser., T. xvii. p. 5, 1862.)

Fig. 78. Two children, sexes not given, with typical albinism, congenitally displaced lenses and tremulous irides; no information as to their siblings nor as to complexion of parents. (Lydston, *West. Med. Reporter*, quoted in *American Journ. of Ophthalmology*, viii. p. 204, 1891.)

Fig. 79. Four complete albinos, aged 12, 9, 4 and 2 years in 1875, in a sibship of nine; three were male one female; the other five dark; father and mother dark. (Sedgwick Saunders, *The Lancet*, 1875, ii. p. 508.)

Fig. 80. One albino (II. 5), aged about 24 (1906), in a childship of six. The albinism very nearly complete (hair slightly coloured), nystagmus, refraction H. As. but V. $\frac{6}{18}$ is not improved by correcting glasses. II. 2, aged 29, 3, aged 27, and 6, have fair hair and blue eyes; II. 4 and 7, medium hair and gray eyes. Mother (I. 1), aged 58, first born of five; she has "auburn" or "golden" hair, gray eyes and good sight; her four siblings (I. 2) and their children (II. 1) all darker than she. Father (I. 4) had very fair, almost white, hair (now darker) and blue eyes; he is 56 and sees well; he was second of eight and the only one who married; of the other seven four were killed in an explosion. (Mr Treacher Collins.)

Fig. 81. Three albinos in five, albinism not quite complete. II. 1, aged 9 (1906), hair very fair, but eyelashes light brown; irides blue, pupils not pink, fundus very albinotic, especially at periphery; refraction H. (not accurately measured); nystagmus and head movements; V. very defective. II. 3, aged 4, hair almost white, brows and lashes not quite white, irides blue, slight but definite nystagmus. II. 5, aged six months, hair white (not seen). II. 2 blue eyes, hair not fair. II. 4 died at two months. Mother not seen, very fair when young, good sight, is third born of eight; first born (I. 1), blue eyes, dark hair (seen). Father (I. 5) fair (not seen). (E. Nettleship.)

PLATE XIII. Fig. 82. One complete albino (IV. 6), aged 20 (1906), and two not proved to be complete (IV. 2 and 4) among five children and one miscarriage (IV. 5) of a woman who married twice. No particulars of vision of IV. 6. IV. 2 born with hair as white as IV. 6 but is now sandy. IV. 4 hair also white at birth and until death at 11 months old. IV. 1 had sandy hair; IV. 3 not so light at birth as the others and got darker; IV. 5 miscarried at sixth week. Mother (III. 2) married twice, hair originally light, now dark brown; during first four months of gestation of IV. 6 she had almost daily more or less haemorrhage. She had one brother and two sisters (*not shown*); only one of these has light hair; of their children (*not shown*) none are specially fair, nor are any of the relations of either husband (III. 1 and 3); no earlier information. Her husbands were not related to each other or to her. (Mr Snowball, Case 1.)

Fig. 83. One complete albino, the elder of two brothers; III. 1, aged 20 (1906); white hair, red pupils, pinkish gray irides, nystagmus, V. $\frac{6}{80}$; refraction not stated. Mother dark brown hair, gray eyes, very fair skin; had four brothers also dark haired and with fair skin, the eldest now 55 is gray haired. Mother's mother (I. 1) also fair skinned. *No consanguinity of parents*. (Mr Snowball, Case 2.)

Fig. 84. Two albinos in a sibship of five. III. 2, *girl* aged 7, with typical characters of complete albinism. III. 5, also a complete albino, died aged ten months. III. 1, 3 and 4 have light brown hair and blue eyes. Mother (II. 4), dark hair and blue eyes; she is fourth of ten, all with blue or blue-gray eyes and reported by their mother (I. 1) to have had very light hair when young. One of her brothers (II. 1 to 5) had children who are normal (*not shown*). Father (II. 11) dark hair and blue eyes; his sister (II. 13) light hair. (Mr Snowball, Case 3.)

Fig. 85. Three albinos in a sibship of five, twins once. IV. 1, aged 13 (1906); IV. 3 and 4 twins of whom 3 was albinotic, both premature and died in a few days; IV. 5, aged 6, albino; IV. 2, aged 10, "no peculiarity." Mother (III. 1), always anaemic, married at 21, one year before birth of IV. 1; died of perforated gastric ulcer two years after birth of IV. 5; had four sisters (*not shown*), two of whom had children (*not shown*), none of these albinotic. Father (III. 2) married at 30; had brothers (*not shown*) who had children (*not shown*), none albinotic. (Mr Snowball, Case 4.)

¹ Parenteau was *Chef de Clinique* to Abadie, who describes the case himself in much the same terms, *L'Union médicale* T. 28 pp. 117—119, 1877, attributing the congenital blindness to "arrest of development" of certain retinal elements, of which evolution is accomplished later.

Fig. 86. Three out of five siblings completely albinotic (III. 7, 8, 9); an uncle a *partial* albino (II. 3). III. 7, aged 11 (1905), complete albino, hair quite white, nystagmus, irides very pale, and show remains of foetal pupillary membrane, red pupils, refraction high H. As., 4 D. horizontal, E. vertical, V. corrected $\frac{6}{80}$. III. 8, aged 7, hair slightly tinged with yellow, refraction high M. As., M. 7 D. vertical, 3 D. horizontal, V. corrected $\frac{6}{36}$; other symptoms typical. III. 9, aged 3, hair slightly yellowish like 8, other characters typical, refraction not measured. All healthy and strong. III. 6, aged 13, and III. 10 aged 1 year, as dark as mother. Mother (II. 8) very dark hair and dark brown eyes, aged about 35; has four brothers and no sisters, no detailed information about them or the parents (I. 7 and 8). Father (II. 4) rather older than II. 8, light sandy hair and light blue eyes; youngest of five by second wife (I. 4) of his father (I. 1); first born (II. 3), blue eyes and hair white till age of 13, when it turned brown, sight believed to have been good, his wife (II. 1), light brown hair, blue eyes, their five children (III. 1 and 2) all very fair, but sight good; II. 5, 6, 7, all dark hair and blue eyes; of their numerous children (III. 3, 4, 5) most were dark and only one, a child of II. 7, known to be fair. I. 1, paternal grandfather of albinos, his seven siblings (I. 2) and his only child (II. 2) by first wife (I. 3), all dark; complexion of I. 3 not known. I. 4, second wife of I. 1 and grandmother of albinos, had light brown hair and blue eyes; no information about her four siblings (I. 5 and 6). All the children, III. 6 to 10, born at full time. (Mr Herbert Fisher, Case 1.)

Fig. 87. Incomplete but general albinism affecting eyes as well as hair in first and only child, aged $2\frac{1}{2}$ years (1905). Mother (III. 5) golden hair. Father (III. 6) and all his people dark. Mother's only whole sibling (III. 4) very dark; her three half siblings (III. 1, 2, 3) all very fair; her mother (II. 2) and the two husbands (II. 1 and 3) and the previous generation (I.), so far as known, all dark. (Mr Fisher, Case 2.)

Fig. 88. A sibship of five (III. 1 to 5) in which the first four (1 to 4) all have very fair hair, blue eyes and good sight; the fifth (III. 5), aged 12 (1906), having white hair, blue eyes, but no nystagmus, is mentally backward, did not walk or talk till six years old, and has congenital absence of second and third fingers of each hand, and on each foot absence of the third toe, and close fleshy union between great and second toes, and between fourth and fifth toes, the bones, however, easily felt; sight cannot be tested, but seems good. Mother (II. 1) blue eyes, hair formerly very fair, now brown; her mother (I. 2) one of twelve, none conspicuously fair; her father (I. 3) a twin and one of fourteen (I. 3, 4, 5), hair- and eye-colour not known, the other twin (I. 4) living and has twenty children (*not shown*). Father (II. 5), fourth born, he and ten of his eleven sibs (II. 3, 4, 6) dark; the first born (II. 2) who is fair, married a rather fair man (II. 7) and has children with very fair hair but good eyes (III. 6); his mother (I. 6) was very fair; no information about his father (I. 7). (Mr Fisher, Case 3.)

Fig. 89. One albino (III. 9) and one semi-albino (III. 6) in a sibship of ten, several of whom show varieties of fairness. III. 9, aged 3 (1906), hair long and yellow, said never to have been lighter, eyebrows and lashes quite white; nystagmus; irides very pale blue and translucent, pupils pink; is intelligent: born at full time; in early infancy "never looked up" (this probably means kept her eyelids closed). III. 6, aged 10, clear history of nystagmus which ceased, "she had very working eyes like Violet" (III. 9), "but it stopped before she was as old as Violet is"; eyes now steady; refraction H. As., H. 3.5 D. horizontal, E. vertical; hair a fair golden; irides peculiar, a narrow zone at extreme periphery dark gray, the rest pale gray but not translucent in daylight, line of demarcation well defined; sight not tested but is good. In III. 8, aged 5, the irides are like those of 6, but the contrast not quite so marked; her eyelashes light brown, eyebrows nearly white, hair very fair flaxen. Of the others, III. 1, born dead, had very fair hair; 4, aged 12, has fair golden hair, brows and lashes not white, blue eyes, no nystagmus; 5, born dead, very fair hair; 10, aged 2, sandy hair, pale gray-blue eyes. III. 2, aged 14, hair and eyelashes brown, irides brown, but eyebrows nearly white. III. 8, light brown hair, brown eyebrows, quite dark brown eyelashes, irides brown with darker peripheral zone, but less marked than in the two above described. III. 3, miscarriage. Mother (II. 6), hair dark reddish-brown, and brown eyes; features Jewish; of her five siblings (II. 1 to 5) II. 1 moderately fair, 2 moderately fair is insane, one of the others, male, very dark; parents (I. 1 and 2) both dark. Father (II. 8) very fair¹, all his sibs (II. 7 to 11) and his father (I. 4) fair, but not conspicuously so; no information as to his mother (I. 3). (Mr. Fisher, Case 4.)

Fig. 90. One albino (II. 6) in a sibship of ten. II. 10 is fair, all the others (II. 1 to 5 and 7 to 9) dark. Father (I. 2) black hair; mother (I. 1) brown. II. 6, aged 29 (1902), yellowish white hair, blue irides, pupils not noticed to be red; small, quick, lateral nystagmus when looking carefully at objects, not otherwise; colour vision good; fundi moderately albinotic, a large patch of opaque nerve-fibres at right optic disc; refraction high H. As., H. 10 horizontal, 7 D. vertical, V. corrected $\frac{6}{36}$. (Mr Fisher, Case 5.)

Fig. 91. Complete albinism with very poor sight in a somewhat undergrown man (5 feet 4 inches), aged 45 (1905), the issue of a union between his own father (I. 2) and his father's daughter (II. 3), the latter being 14 years old at the time. I. 1 dark, I. 2 very dark, II. 1, 2, 3 all dark. I. 3 fair, but not conspicuously so. II. 4 married a woman with auburn hair and brown eyes (*not shown*) who died of consumption; all their three children, III. 1, 2, 3, had brown eyes and died of consumption between five years and eleven months of age. All these people are from a fishing village where intermarriage has been very common. (Mr Rushworth Keele, Case 1.)

¹ Eye-brows and -lashes almost white, hair nearly as light as albino III. 9's, but sight good.

Fig. 92. Complete albinism with nystagmus and defective sight in a man (III. 7), aged 29 (1905), the youngest living of a sibship of seven; the four older siblings (III. 3 to 6), dark hair, fair skin and blue eyes; III. 8 and 9 died in infancy, places in sibship unknown; IV. 1 the only issue so far of III., aged 12, no details. Mother (II. 3), third of three all with dark hair, but she had fair skin and blue eyes, died at 46. Father (II. 4), one of six, also dark hair, fair skin and blue eyes, died at 48. II. 3 and 4, first cousins, children of a brother and sister, but which was born to the brother and which to the sister is unknown. (Mr Keele, Case 2.)

Fig. 93. Completely albinotic child (III. 1), aged 7 months (1905), born about 18 months after marriage; no other pregnancies. Father (II. 1), dark hair and eyes, Italian, knows of no light haired relations. Mother (II. 2), dark brown hair and brunette skin, aged 24, English, has four siblings; no markedly fair ones amongst them (II. 3 to 6) or their children (III. 2 to 5). (Mr Hartridge.)

Fig. 94. *Partial* albinism (eyes only) in one child (II. 3) and complete in the next born (II. 4) in a sibship of six. II. 3, aged 17 (1906), hair, eyebrows and eyelashes "medium reddish-brown, and has always been the same shade"; when first seen at age of nine the hair was described as "of a medium brown colour"; eyes perfectly albinotic, irides very thin and translucent, sclerotic translucent, no pigment whatever visible in fundus; refraction high M. As. increasing with age; R. aet. 9, M. 5 D. vertical, 3 D. horizontal; aet. 17, M. 14 D. and 10 D.; L. aet. 9 M. 6 D. vertical, 4 D. horizontal; aet. 17, M. 11 D. and 7 D. V. throughout $\frac{6}{80}$ to $\frac{6}{38}$; marked lateral nystagmus. II. 4 had white hair and pink eyes and died at nine months. II. 1, 2, 5 and 6 all rather dark. Parents, first cousins, (I. 1 and 2) both dark hair and medium complexions. (Mr Hartridge.)

PLATE XIV. Fig. 95. Three complete albinos (II. 7, 9, 11) in a sibship of eleven. II. 9, aged 85 (summer, 1905), single. Mentally quite keen, hearing very good. Hair nearly white with slight yellow tinge in places, not at all bald, eyebrows and lashes very light but not white, has a well-developed moustache of same colour; irides gray, pupils pink; lateral nystagmus nearly constant but not well-marked; refraction H. in both eyes, degree could not be measured; sight always defective and could never get glasses to suit her, could read till three years ago; a few opacities in each lens: fundi normal, light, but not so light as in most albinos. Died 11th November, 1905, in consequence of a burn. II. 7, single, died at 82 of "dropsy"; hair and eyes were like II. 9, was "short sighted" and eyes "moved much faster than" II. 9. II. 11, single, a farmer, L. eye operated for cataract by C. H. Usher, July 1903, patient being then 75; did well and got V. with glasses $\frac{6}{80}$ and 6 Jaeger; died August 1904, aged 76, of pneumonia; when first seen, 1902, light hair and irides, constant fine lateral nystagmus; L. complete cataract; R. commencing at posterior pole, fundus normal but typically albinotic, V. $\frac{4}{80}$ and reads 4 J. close to with + 7 D. lens, *i.e.* defect of sight much greater than commencing opacity of lens will explain. Piece of iris removed at the operation on L. preserved, and microscopical sections made and show a fair quantity of pigment in the double layer of uveal cells on its posterior surface (see the chapter on the albinotic eye). The other siblings (II. 1 to 6, and 10) all brown hair but 8 was still-born and colour is not known. In III. and IV. no albinos and none with light hair. III. 4, with brown hair, married a woman with auburn hair and rather dark eyes, and had seven children (IV. 1 to 7), all with either red or auburn hair and at least two with blue eyes (5 and 6), IV. 5, aged 6 (1905), is myopic 8 D.; it is not known whether III. 4 and his wife were cousins. III. 5 died at $5\frac{1}{2}$ years. I. 3 and 4 (first cousins), both dark or brown hair and good sight: 4 lived to be 82; none of the others of I. albinotic; no earlier information. No defects or peculiarities known except albinism. (Usher and Nettleship, *Transactions of Ophthalmological Society*, xxvi. p. 249, 1906.)

Fig. 96. Five albinos of different degrees in three generations. IV. 4, aged 26 (1905), single, an unusually intelligent and well-educated maid-servant; hair almost quite white, eyebrows and lashes white, gray irides, pink pupils, lateral nystagmus 100 per minute; V. $\frac{6}{80}$ improved by + 2 D. cylinder to $\frac{6}{38}$ partly, refraction H. 2 D. horizontal, Em. vertical; fundus normal, very albinotic; colour-vision (Holmgren's test) normal; eyes (irides) said by her friends to have got darker in the last two years; has scars of old tuberculous abscesses on R. neck and cheek, and a small opacity from ulcer on L. cornea. IV. 3, seen 1898; nearly perfect albino, with red pupils, bluish irides, very albinotic choroid, nystagmus and V. only $\frac{6}{80}$ not improvable; refraction not noted. IV. 2 was "very fair and very short-sighted" according to IV. 4. II. 1 known to have been an albino; had four children (III. 1 to 4) of whom the third (III. 3) was "very fair and short-sighted" and died unmarried; *not known whether* II. 1 and 2 *were cousins*, and colour of hair and eyes of 2 not known. III. 1, reddish-brown hair, said to be "short-sighted, but eyes do not move," his wife not a cousin, six of his seven children (IV. 1) rather dark. III. 2, reddish-brown hair, died at 40 ("burst blood-vessel"), married 5, not a cousin, with quite dark hair, who also died at 40 after lingering illness, and had four children of whom IV. 3 and 4, see above; IV. 5, aged 24, has light brown hair, steady eyes, good sight, 6 died in first year of life. Prevalent colour of hair and eyes on non-albinotic side of pedigree dark, none decidedly fair. I. 1 and 2 natives of same village and had same name, but not known to have been cousins; I. 3 and 4 certainly not cousins. (C. H. Usher.)

Fig. 97. Three albinos in a sibship of seven. IV. 3, aged 30 (1905), single, perfect albino, except a very slight tinge of yellow at tips of hair (long), red pupils, pale blue irides, extremely albinotic choroids; nystagmus, refraction My. As., R. My. 6 D. and 3 D. in chief meridians, V. corrected $\frac{6}{80}$, L. My. 3 D. and 4.5, V. $\frac{6}{80}$ partly, corrected; colour vision normal. Dyspeptic and history of ulcer of stomach. Functions normal. Intelligent and did well at school; musical. IV. 4, aged 30, married three years, no issue; pleasant, bright and cheerful, musical and sings. Condition practically identical with the last, except refraction, R. My. 2 D. vertical, H. 2 D. horizontal, V. corrected $\frac{6}{80}$, L. H. 4 D. horizontal, V. corrected $\frac{6}{80}$ partly; colour vision normal: photophobia not well marked. IV. 7, aged about 24, single, well-marked albino, but refused to be examined; sings at concerts. Mother (III. 15), second of six, dark hair, blue eyes, good sight. Father (III. 5), aged 59, hair now dark and eyes blue medium, neither blue nor brown, but "when at school hair was so fair he was called 'white-head,' and even at 20 it was light"; he was the middle of nine, one (IV. 7), killed at 28, had auburn hair, all the others dark or black, but two with red beards. III. 9 has children (IV. 13, 14), of whom one has ichthyosis and fair skin, the others dark. III. 13 to 19 all dark. I. 10 light hair; I. 15 red hair. II. 7 fair, good sight, lived to 82; II. 6 light, but not white, hair, steady eyes, good sight, died just before marriage. Remainder of II. and III. all more or less dark. IV. 6 and 8, auburn; two of IV. 15 fair, the rest dark. I. 1 was dark and lived to 90; 4 and 6 dark; no information as to the others. No consanguinity anywhere. (C. H. Usher.)

Fig. 98. Two albinos in an extensive pedigree. III. 10, first born of five, aged 63 (1905), complete albino with gray irides, red pupils, highly albinotic choroids with large myopic crescents below optic discs, hair, lashes and eyebrows white, but formerly hair was light yellow at tips; lateral nystagmus, 124 per minute; refraction My., amount not stated, V. $\frac{2}{80}$ and 12 Jaeger at 4"; colour vision (wool test) normal; skin not tender; healthy, strong, and does not tire easily; has had no illnesses; intelligence good; has had 13 conceptions, of which IV. 6, 12, 13 miscarried, 11 died in childhood, and nine are living aged from 42 to 20. I. 3 had very fair hair, "short sight" and moving eyes, and was doubtless albinotic. II. 19 (mother of albino III. 10), dark hair, brown eyes; died at 32 from operation for tumour of womb whilst pregnant with twins, *not shown*. Father (II. 10), black hair and eyes, lived to 78. Hair- and eye-colour in others: II. not known to contain a single fair one, certainly mostly dark. III. 12 and 13 blue eyes and rather light hair. No others known to be decidedly fair in II., III. or IV. and many quite dark. No consanguineous marriages anywhere. Summary—The living albino (III. 10) had two very dark and two moderately light siblings. The albino (III. 10), marrying a very dark-haired man, has ten children, five light and five dark, none albinotic. Albino's parents both dark, but her father's mother albinotic. (C. H. Usher.)

PLATE XV. Fig. 99. A single instance of complete albinism (VI. 16) in a very extensive pedigree, all the eight siblings (VI. 15, &c.) having light hair and blue eyes but none said to be very fair. VI. 16, aged about 20 (1906), has white hair, red pupils, nystagmus and "short sight"; he is in America. Father (V. 9) reddish hair; his eldest sib (V. 1), light hair and blue eyes, two others brown hair; both his parents (IV. 1 and 4) light brown hair and blue eyes. Mother (V. 13) dark hair and blue eyes; her father (IV. 8) dark hair and blue eyes, mother (IV. 19) dark hair and eyes. Eyes blue with more or less dark brown hair, in all Gen. III. (except 1 and 2, of which there is no information). II. 1 was moderately fair; II. 2 to 6 dark. II. 8, born 1762, was called "Ban" (*i.e.* "White") F..., and was therefore probably very fair. Very few are stated to have been black or extremely dark haired. (C. H. Usher.)

Fig. 100. Five albinos in generation V. and, from the history, one in generation II. V. 11, aged 24 (1906), complete albino except for a slight yellowish tinge at the tip of the hair, eyebrows and eyelashes quite white, irides very light blue and transmit red light from fundus, pupils red, fundi reddish at central region paler peripherally, but everywhere typically albinotic so that optic disc is darker than choroid; rapid, short, lateral nystagmus 122 per minute; R. H. with As.?, V. $\frac{5}{80}$, L. mixed As., V. $\frac{4}{80}$. Is intelligent, strong and healthy; catamenia normal. Native of Orkney; does farm work. V. 12, her sister, two years older (places reversed on diagram), and very dark haired. V. 16 to 19, four male albinos born consecutively in a sibship of eleven; the eldest of them (V. 16) died at ten months old after a very short illness; the other three alive, aged 26, 24 and 22, strong, well-grown, intelligent labourers and artisans. V. 17 abroad; 18 and 19 seen, both completely albinotic with light gray iris, red pupils, hair silvery white, but said to be yellowish at end if left to grow long; rapid lateral nystagmus (150 and 118 respectively); refraction H. in both, but not measured, V. $\frac{3}{80}$ to $\frac{6}{80}$. V. 23 died at 18 months, the other six non-albinos living and well, all either black or very dark hair and "medium" eyes. Ages from 32 (V. 13) to 15 (V. 22). All the albinos born at full time and mother's health was good with all. In IV. 5 to 10 and 13 to 17, 10 and 15 both quite dark; 7 sandy hair and blue eyes, 13 dark, 5, 6, 8, 9 blue eyed with sandy or reddish hair, 14 to 17 all dark. Of the grandparents of the albinos, III. 3 and 9 rather dark; III. 13 and 27, and indeed almost all from 12 to 32, more or less dark. III. 3 had white or very light hair and "defective" sight and was probably albinotic; nothing known about his children, but some of his grandchildren (IV. 1 to 4) were short-sighted, though none specially light-haired. Of the earlier numbers of V. (1 to 10) the majority dark and none very light. No cousin marriages anywhere. II. 13, a great-great aunt of the albinos, had a *congenital malformation of fingers*, the distal phalanges being, according to a photograph, absent on one hand. (C. H. Usher.)

PLATE XVI. Fig. 101. Two typical albinos in a sibship of seven. II. 5, aged 10 (1906), high H. As., H. 6.5 D. horizontal, 2.75 D. vertical, V. corrected $\frac{6}{34}$. II. 6, aged 8½, M. As., M. 6 D. nearly vertical, 4.5 D. nearly horizontal, V. corrected $\frac{6}{34}$. II. 2, aged 18, pale blue eyes; all the other siblings and both parents dark. (Mr Wharton, Case 1.)

Fig. 102. One typical albino, aged 9, with nystagmus and M. As., M. 3 D. and 1 D., axes oblique, V. corrected $\frac{6}{34}$. The two siblings (III. 2 and 3) rather dark. Mother (II. 1) sandy haired; all her relations said to be dark. Father (II. 2) light haired; says that fair hair prevails on his mother's side and dark on his father's, but never heard of anyone like III. 1. (Mr Wharton, Case 2.)

Fig. 103. III. 1, typical albino, aged 22, with nystagmus, refraction 2 D. of simple H., V. less than $\frac{6}{30}$, reads 8 J. His two sisters (III. 2 and 3) and both parents (II. 1 and 2) dark. Father (II. 2) had a dark sister (II. 3), but she had two albino children (III. 4 and 5). (Mr Wharton, Case 3.)

Fig. 104. In a sibship of eleven four complete albinos (III. 6, 9, 10, 11), and one said to have a congenitally white patch of skin (III. 7). III. 9, aged seven, refraction H. As., H. 3 D. horizontal, E. vertical, V. corrected $\frac{6}{30}$. III. 6, an albino who lived only two years four months; 10 and 11, two other albinos, both dead. III. 7, not seen, but stated by father to have "a milk-white patch, the width of his thumb, across the abdomen at the level of the umbilicus"; it has been present from birth; no note whether bilateral or not. All efforts to see this girl failed; her hair said to be dark. All the other siblings (III. 1, 2, 3, 4, 5, 8) dark. Mother (II. 1); father (II. 2) fair; the four grandparents (I. 1 to 4) all darkish. (Mr Wharton, Case 4.)

Fig. 105. Three albinos in a family from the Argentine. III. 1, an albino boy aged 12; complete albinism, photophobia, congenital rotatory nystagmus, 5 D. of H. III. 2, an albinotic sister who died of pneumonia, 13 years old. II. 1, an albino uncle, brother of the mother. (Professor Lagleyze of Buenos Ayres, communicated by letter 1906; afterwards published: *Archives d'Ophthalmologie*, May—Juin, 1907, Offprint p. 43. Obs. III.)

Fig. 106. Three complete albinos from the Argentine, all with horizontal nystagmus and photophobia in a sibship of five. IV. 4, aged 20 (1905); at 8 years high H. As., H. 10 D. horizontal, 8 D. vertical; at 20 H. reduced to 5 D., but astigmatism remains the same, V. $\frac{1}{10}$. IV. 5, aged 14, mixed As., M. 1 D. vertical, H. 3 D. horizontal, V. $\frac{1}{10}$. IV. 6, aged 13, H. As., 3.5 D. horizontal. Father, III. 2, dark eyes and chestnut hair; mother, III. 3, second wife, red hair and blue eyes, they are first cousins. No knowledge of any case of albinism in their ascendants. By a first non-consanguineous wife the father had three normal children. A first cousin, III. 4, of the father, with dark brown hair and eyes, had a white lock of hair on the head, he has married a woman, III. 5, of another family and country; they have eight children of whom four daughters are albinos, the three first and the youngest, two normal sons and two normal daughters come between. (Professor Lagleyze, *Ibid.* Obs. V., VI., VII.)

Fig. 107. Two complete albinos in a sibship from the Argentine; uncertain whether there were other siblings. II. 1, aged 10 when seen, born nine years before II. 2, who was aged 5 when seen, both had horizontal nystagmus and photophobia. II. 1 in R., mixed As., M. 1 D. vertical, H. 4 D. horizontal, L. M. 1 D. oblique, H. 3 D. oblique, V. $\frac{1}{8}$. II. 2 had H. As., H. 1 D. vertical, 5.5 D. horizontal. (Professor Lagleyze, *Ibid.* Obs. VIII. and IX.)

Fig. 108. Three completely albinotic sons the only offspring of a woman, III. 1, who married her father's brother, II. 3. IV. 1, horizontal nystagmus and photophobia and to fix vision on an object he regards it obliquely. Parents are not albinotic and know of no earlier cases in family. III. 1, aged 38, strong, dark hair and eyes, has congenital cataract of left eye and mixed astigmatism of right. Argentine. (Professor Lagleyze, *Ibid.* Obs. X.)

Fig. 109. Three complete albinos in a sibship of six. The albinos are: IV. 1, aged 12 when seen (1899), good health, horizontal nystagmus, ample and slow, 80 to 85 per minute, photophobia, small pupils; high M. As., M. 11.5 D. and 4.5 D., V. $\frac{1}{10}$; her brother, IV. 4, aged eight, 1890, good constitution, horizontal nystagmus, not so ample, 120 per minute, photophobia, small pupils, M. As., M. 2.5 D. and 1.5 D., V. $\frac{1}{10}$; the sister, IV. 5, has less photophobia than IV. 1 or 4, horizontal nystagmus, ample, 90 per minute; pupils slightly smaller than normal, M. As., M. 7 D. and 5 D., V. $\frac{1}{10}$. All three have normal colour vision; under action of atropine the transmitted red in the iris disappears when ophthalmoscopically examined¹. The parents, III. 2 and 3, are first cousins. The father, III. 3, has hair and beard almost black and eyes dark chestnut. The mother, III. 2, has light chestnut hair, and was blond in her youth, the colour of her irides is "bleu verdâtre," spotted with rusty points (points rouillés). All members of this family grow gray prematurely.

¹ Lagleyze describes fully the iris of all three albinos seen without atropine, but we have only space to note that of IV. 1: L'iris, de couleur blanc grisâtre dans le voisinage du bord pupillaire sur une étendue de 2 mm., se prolonge en certains points, de sorte qu'il ne forme pas un anneau nettement dessiné; le corps de l'iris, de couleur bleuâtre et violacée, laisse voir la couleur rougeâtre du fond de l'œil. Sur le grand cercle de l'iris on note quelques points grisâtres pareils à ceux du bord pupillaire, séparés et petits (p. 45).

There are no antecedents of albinism, the grandparents, great-grandparents and great-great-grandparents were normal. The father had a sister, III. 4, who was a deaf mute dwarf, with defective intelligence, she died aged 42 of nephritis, and a brother, III. 5, with cleft palate, who died aged a few months. Argentine. (Professor Lagleyze, *Ibid.* Obs. XI., XII., XIII.)

Fig. 110. Two complete albinos in a sibship of seven, IV. 1 aged 24 (1904), very albinotic fundi, so that the disc is recognized only by the emergence of retinal vessels; high H. As., H. 6.75 D. horizontal, 1 D. vertical, V. $\frac{1}{10}$, difficult. IV. 2, aged 13 (1903), horizontal nystagmus, photophobia, H. As., H. 5 D. horizontal, 1 D. vertical, V. R. $\frac{1}{50}$, L. $\frac{1}{20}$; normal colour vision. There are five normal siblings. Their parents, III. 1 and 2, are first cousins. The albinos have two second cousins, IV. 4 and 5, who are also albinotic, and whose parents, II. 4 and III. 3, are uncle and niece, and closely related to III. 1 and 2. Argentine. (Professor Lagleyze, *Ibid.* Obs. XIV. and XV.)

Fig. 111. Two albinos in a sibship of eight, the parents being unrelated and having dark eyes and hair; no known case of albinism in ancestry or collaterals. II. 1, aged 42, is an incomplete albino; skin white and the same as in complete albinos. Hair of scalp, beard, eyebrows and lashes "de couleur blond clair"; horizontal nystagmus, considerable amplitude and slow; photophobia when light is strong, field of vision and colour sense normal, mixed As., about H. 1 D. and M. 2 D. (not exactly alike in the two eyes). The colour of the iris is "bleu cendré clair," and the pupils are black. No pigment visible in the fundus, which is like that of complete albinos; "on voit les vaisseaux choroïdiens et avec une grande netteté la couche chorio-capillaire; les papilles sont presque de la couleur du fond de l'œil."

No details of the sister, II. 2; they have six normal brothers. Argentine. (Professor Lagleyze, *Ibid.* Obs. XVI.)

Fig. 112. Two sibships, half-first cousins to each other, each containing three albinos. III. 3, born 1870, aged 35 (1905), white hair, nystagmus, very defective sight, refraction slight H. III. 1, albino, born 1865, died aged 2½ years. III. 4, albino, born 1870, died aged 18 years. Of the other siblings, III. 7 and 8 are living and have dark hair. III. 5 and 6 are dead. In the other sibship, III. 11, aged 21, hair nearly white, irides light blue, pupils pink, choroids pale, nystagmus, H. As. III. 16, aged 10, complete albinism, defective intellect and speech. III. 9, aged 29, an albino "as bad as" III. 11, is abroad. The mother (II. 2) of the first sibship and the father (II. 4) of the second, were children of the same mother (I. 2) by different fathers (I. 1 and 3). Though I. 1, 2 and 3 all had the same name there was no recognised kinship between any of them. I. 2 had dark hair, II. 2 has light hair; no information about the others. None of the albinos are married. (Mr. A. Hugh Thompson.)

Fig. 113. One albino (IV. 2) in a sibship of three. IV. 2, aged 26 (1906), hair, eyebrows and eyelashes pale dull yellowish, pupils red, fundus devoid of pigment, nystagmus, refraction H. As., R. H. 4 D. nearly horizontal, 2 D. nearly vertical, L. H. 4 D. and 1 D. respectively. IV. 3, dark; IV. 4, fair. Hair- and eye-colour in others: fair, I. 5 ("flaxen" hair); II. 6 and 8; III. 2 and 3 (light red hair, aged 48); IV. 1. Dark, I. 1 and 2, II. 3, 4, 5, 7, 9, III. 1 and 4. The "dark" ones have brown hair. (Dr Schoute, Amsterdam.)

PLATE XVII. Fig. 114. Three complete albinos in a sibship of ten. III. 5, aged 19, hair almost, brows and lashes quite white, iris light blue-gray and translucent, oblique nystagmus, refraction H. 7 D. with some As., V. with + 7 D. $\frac{6}{10}$. III. 4, aged 28, has head movements as well as nystagmus. III. 3, hair light yellowish, moustache yellowish, brows and lashes quite white, lateral nystagmus, iris light gray and translucent, V. $\frac{1}{20}$. III. 1 and 2, brown hair and dark eyes, places in sibship not given. III. 6, five others, places not given, who died of various exanthemata before the age of two years; they were dark. Mother (II. 1), dark brown hair, blue eyes. Father (II. 2) had nearly black hair and gray eyes. No albinism known in grandparents. (Dr Lewis H. Taylor, Wilkes-Barre, Pa. U.S.A.)

Fig. 115. Two sibships, cousins to each other, each with consanguineous parents, and each containing one albino. III. 3, aged 15 months (1905), hair of head light flaxen, nearly white, iris light blue and translucent, pupil red, fundus albinotic, refraction moderate M. vertical, E. horizontal, nystagmus, child intelligent but cannot walk yet. The two siblings, III. 1 and 2, healthy. Second sibship; III. 4 an albino who died at two years, he had "red eyes," nystagmus and very "short sight"; he has six siblings. No note on complexion of any except the albinos. *Several other cases of albinism known in other branches of same stock, but particulars cannot be obtained.* (Dr Ischreyt, Libau.)

Fig. 116. Three albinos in a sibship of nine. III. 2, aged 13 (1906), albinism quite complete and typical in all respects, nystagmus, marked intolerance of light, very defective sight, but intelligence good, refraction, R. simple M. 10 D., L. M. As., 10 D. vertical, 6 D. horizontal. III. 8, aged two, similarly complete case with intolerance of light; refraction H. As., H. 2.5 D. horizontal, E. vertical. III. 9, aged nine months, completely albinotic like the others, not well nourished; high H. with very little As., right H. 5.5 D. horizontal, 5 D. vertical, left corresponding figures 5 D. and 4 D. Hair- and eye-colour of others: III. 1, aged 14, light brown hair, blue eyes; 3, aged 11, brown hair, blue eyes; 7, aged five, fair hair, blue eyes; 4, aged nine, 5, aged eight, 6, aged seven, all dark hair and dark brown eyes.

Mother and father (II. 1 and 2), medium or rather dark coloured hair; mother (II. 2), one of thirteen, of whom at least three brothers and one sister (II. 3, 4, 5, 7), had dark brown hair. (Mr Winfield Roll.)

Fig. 117. One albino in four children. IV. 1, aged 16 (1906), hair nearly white, iris blue-gray, slight lateral nystagmus. None of his three siblings (IV. 2, 3, 4) have white hair. On mother's side none have specially light hair. Father (III. 2) had *white hair* when a boy, but his siblings (III. 3) all dark haired; his mother's brother (II. 2) was very fair. Phthisis in a sister and an uncle of father (III. 2). (Dr H. J. Cooper.)

Fig. 118. Four albinos (IV. 5, 6, 7, 9) and one fair child (8), the issue of fair father and mother. Marked prevalence of fair complexion and hair in earlier generations on both sides. IV. 5, aged 14 (1905), complete albino with lavender coloured iris, rapid lateral nystagmus and extreme M. As.; when first seen, aged 11; 15 D. vertical and 6 D. horizontal in right, 13 D. and 4.5 D. correspondingly in left, V. corrected $\frac{6}{60}$. IV. 6, aged 12 (1905), hair not quite white (straw-coloured), other characters as in last case and fundus albinotic; refraction when aged nine, high M. As., right M. 9 D. vertical, 4 D. horizontal, left 7.5 D. and 3.5 D. correspondingly. IV. 7, aged 10 (1905), complete albino with white hair, pink eyes and lateral nystagmus, fundus albinotic; refraction at $7\frac{1}{2}$ years old extreme M. with moderate As., each eye M. 24 D. vertical, 20 D. horizontal. IV. 9, aged 6 (1905), complete albino. The remaining sibling (IV. 8), fair hair, blue eyes, good sight. All were born at full time. Father (III. 9) had "quite white" hair in childhood, now light brown, eyes blue, V. $\frac{6}{60}$. Mother (III. 17) somewhat fair hair but brown eyes. Father (III. 9) is third of eight; 11 and 14 dark, all the others of the sibship fair in degrees; his father (II. 7) and also II. 1, 4, 5 and 6, fair; II. 2 and 3 dark. Mother (III. 17), third of three, 16 being light, 15 dark; her father (II. 8) and one sister (II. 13) fair; their mother (I. 3) fair, and light blue eyes. II. 9, 10, 11, 12, 14, dark. I. 2, jet black hair. Of the others, III. 5 and 6, IV. 2, 4, 10 and 11 (twins) and 15, all fair in degrees, also some of III. 18 to 22. Known to be dark: III. 4, IV. 3, 12, 13, 14, and some of III. 18 to 22. The wife of I. 1 (*not shown*) was operated upon for cataract; one of the daughters (II. 5) and a granddaughter (either III. 1 or III. 2) are also known to have had cataract; this has no relation to the albinism. (Mr Payan Dawnay and Mr Inglis Taylor.)

Fig. 119. Four complete albinos in eight children. III. 1, aged 30, complete albino, white hair, brows and lashes, sight was always bad but could see small print close to till he was 14; at that age L. eye lost by a blow from a piece of wood (probably rupture of sclerotic), and was excised at the Moorfields Hospital by Mr Tay a few days after; reference to the register shows that the choroid seemed completely albinotic and the eye was of highly myopic formation; about a year after removal of L., the R. became inflamed and painful, and in about three years had become quite blind; it had been the better of the two; in 1905 E. Nettleship found the results of old plastic iritis with closed pupil and slightly subnormal tension; nystagmus was well marked. III. 5, aged 24 (1905), hair, brows and lashes quite white, nystagmus; quite blind from disease; R., blue-gray iris, deep-seated opacity of lens preventing ophthalmoscopic examination, iris not tremulous, anterior chamber normal, tension rather subnormal; had a blow close to (? on) this eye three years ago, but is not sure he could see with it before; L., old irido-cyclitis with partly decolourized blood (? buff coloured exudation) in anterior chamber, tension subnormal, probably retina is detached. III. 2, an albino girl who died at a week old, hair perfectly white, "her little head was like a ball of silver." III. 7, aged about 20, complete albino with very defective sight and myopic refraction. Of the other siblings, III. 4, sandy hair and blue eyes, married a man with medium hair and has one child, IV. 5, aged two, with red hair and blue eyes; III. 3, 6 and 8, quite dark; III. 3 married a dark man, and has four children, of whom IV. 1 and 3 have very light hair, IV. 2, medium hair, blue eyes, IV. 4, quite dark. Hair and eyes fair to sandy red in II. 2 and her mother, I. 2, and II. 9, 10, 11, 12, 14, 15; dark, II. 13, 16, 17; I. 3 and 6, medium; I. 5, very dark; II. 1, brown hair, II. 3, 4, 5, dark or very dark. Mother of albinos (II. 6), hair was very dark (now turning gray), eyes are blue; father (II. 9) had "sandy" or "ginger" or "carrot" hair. The sibship, III. 1 to 8, all born at full time and mother's health good. (Mr Holmes Spicer.)

Fig. 120. Partial albinism (albinism of eyes only) in the only child (IV. 6) born alive out of six; probably similar albinism in mother's father (II. 2). IV. 6, seen by E. Nettleship when aged 11 (1892), again at 14, and again with Mr Wherry at Cambridge at 24 (Feb. 1906); conditions exactly the same at each examination. He was born at full time about three years after the marriage of parents, III. 4 and 10, they being each 24 years old when married; one miscarriage preceded, and four still births at seven months followed his birth (IV. 5 and 7). Mother had plenty of milk for IV. 6, but he refused to suck and was bottle-fed. Some time after birth of IV. 6, mother (III. 4) was found to be suffering from Bright's disease, and she died of it at about 36; the doctors considered the disease caused the death and premature delivery of some, if not all, of the later children (IV. 7); it may have begun long before it was discovered; she was abstemious as regards alcohol. Nothing noticeable in her health when pregnant with IV. 6. She was fourth in a sibship of nine (III. 1 to 9), and of them no less than four (III. 1, 2, 3 and 6) died of phthisis between 35 and 45, and another (9) who had been asthmatic died of "pneumonia"; III. 5, 7 and 8 still living, aged from about 50 downwards. Not much information as to colour of hair and eyes. Of IV. 10 and 11, one is fair. III. 5 was darker than his siblings and was called "darkie," but none were

noticeably fair. None of II. 1, 2, 3 were fair when grown up, although II. 2 is marked as albinotic; he is well known to have had "peculiar sight and moving eyes," but hair said to have been dark (as an adult), he was a milk-seller and managed pretty well; the conjecture is that his eyes resembled those of IV. 6. III. 10 (father of IV. 6), now 53, nearly black hair; no precise note of colour of hair and eyes in mother, III. 4. IV. 6, refraction and V. the same at 11, and 24, viz. M. 9 D., V. corrected $\frac{6}{38}$, irides light gray, when light is concentrated on anterior part of sclerotic pupils become quite red, and iris transmits light (1892 and 1906); fundus completely albinotic, every vessel in the choroid standing out clearly as if there were no other structure; this is somewhat more marked at centre (posterior pole of eye) than periphery, doubtless owing to myopic stretching, but there is no trace of patchy or linear atrophy of choroid; a myopic crescent at temporal border of disc equal to half its diameter, the edge of the crescent sharply marked off from, not merging gradually into, the albinotic choroid beyond (1906); in each eye a very large choroidal trunk passes from edge of disc straight out to yellow-spot; notwithstanding this condition of eyes, hair of head at 11 and now at 24, dark brown, eyebrows and eyelashes dark and long, skin not fair and does not burn much from exposure to sun; but his father states that the hair (of IV. 6) was fair in infancy or childhood and gradually darkened; slow lateral nystagmus, which is said to have been seen within three days of birth: dislikes bright light and habitually wears smoked glasses. (Nettleship, in *Roy. Lond. Ophth. Hosp. Reports*, xv. p. 115. Patient examined again with the co-operation of Mr Wherry at Cambridge in 1906, when the pedigree was much enlarged.)

Fig. 121. Complete albinism in first child, III. 1; first examined at four months old; when nine months old still sees very badly and shows irregular, purposeless movements of eyes (not rhythmical nystagmus); refraction H. 1 horizontal, E. vertical. Mother married at 17, and was 18 when child was born, healthy and dark, eleventh of fifteen (II. 1 to 15); father healthy, not fair, quite a young man. Family history well known for Gen. I. and at least one generation earlier (*not shown*), and no albinism or very light hair ever heard of. (Mr E. C. Green, Case 1.)

Fig. 122. *Incomplete* albinism in first born of five children. III. 6, aged 14 (1906), hair originally white, now light yellow; irides light blue, pupils red in a good light; dislikes bright light; refraction mixed As., M. 2 D. vertical, H. 2 D. horizontal, V. corrected $\frac{6}{38}$. Of her four siblings, III. 9 has very light hair, 7, 8 and 10 dark. Mother (II. 3), eyes blue, hair light and was very light as a child, brows and lashes same colour as head; fundus fair but not albinotic. Father (II. 4) quite dark. Mother has two siblings (II. 1 and 2), both light. II. 1 has six children, one of whom (III. 1) is very and another (III. 2) moderately light; the other four (III. 3) dark. II. 2 has one fair-haired girl (III. 5) and one dark-haired boy (III. 4). (Mr Green, Case 2.)

Fig. 123. One albino in a sibship of five. II. 2, aged nine (1906), pure white hair, red pupils, nystagmus, photophobia, very defective vision; the other four siblings healthy and normal. Mother dark; father (I. 2) light. No other cases, family history fairly well known. (Mr Green, Case 3.)

PLATE XVIII. Fig. 124. Three albinos in seven children; Hindoo family. III. 2, albino, died at 12 years old; would now be 32 (1906). III. 4, albino, died at 14, would now be 20. III. 7, albino, living, aged 11. Their siblings: III. 1, living, aged 40, dark (normal), *married and has children all dark*; III. 3, normal, died at 11, would be 29; III. 5, living, aged 16, normal; III. 6, living, 14, normal. All those indicated in I. and II. were normally dark. (Dr Pearse, Calcutta: *Journal of Tropical Medicine*, Vol. II., p. 294, 1899—1900, Case 1.)

Fig. 125. Four albinos in eight children; Hindoo family. II. 1, 2, 3, albinos, all dead, all married but no issue. II. 4, albino, living, aged 40 (1906), has two children (III. 1 and 2), both normally dark. The other four siblings (5—8) normal; they have, amongst them, two children both normal. Parents normal. No albinos amongst the parents' siblings or their children, and none known among grandparents. (Dr Pearse, *Ibid.*, Case 2.)

Fig. 126. Two albinos in three children; Hindoo family. III. 2, living, aged six (1906); 3, albino, living, aged four. The eldest child (III. 1), normally dark, aged 11. No statement as to conceptions between III. 1 and 2. Father (II. 2), aged about 48, and his three siblings, normal. Mother (II. 3), an only child, normal. Grandparents normal. (Dr Pearse, *Ibid.*, Case 3.)

Fig. 127. One albino (III. 2), aged 11 months (1906), and one normal child, aged three years; Hindoos. Father (II. 3) and his four siblings; mother (II. 4) and her eight siblings, and the four grandparents, normal Hindoos. (Dr Pearse, Case 4.)

Fig. 128. Two albinos in a sibship of three; Hindoo family. III. 1, albino, aged 25 (1906), single; III. 2, albino, aged 20, is married to a normal dark Hindoo and has two dark children (IV. 1). III. 3, aged 13, normal. Father (II. 3) and his eight siblings normal. Mother (II. 4), normal; has one living brother (II. 5) said to have dark hair but white body, "*probably leukoderma*" (Dr Pearse). Grandparents normal. (Dr Pearse, Case 5.)

Fig. 129. Two albinotic Hindoo brothers with some normal siblings (number not stated); II. 1 is described as a pure albino native lad with white skin but some small pigmented patches on chest, and some brownish discolourations on hands and lower part of forearms; hair white; eyes pink. Parents normal and no other cases of albinism known in family. (Dr Pearce, *Ibid.*, Case 6, with a good illustration from a photograph.)

Fig. 130. Four incomplete albinos, children of same father by different mothers. IV. 12, aged 18 (1905), very fair hair, red reflex from pupils, makes no complaint of sight, no nystagmus, strong and healthy, illegitimate; father (III. 12), 33 when she was born, has light hair and blue eyes, his sight defective from Leber's family optic atrophy; died in April 1906, aged 51—52, after three months' headache and vomiting without rise of temperature. Mother of IV. 12 had dark hair and brown eyes. IV. 13, aged ten (1905), iris light blue, slight red reflex from pupils, choroid fair, no nystagmus, refraction Em. and V. good (read 1 J. at 11 inches), hair not so fair as the next two. IV. 14, aged seven, hair much fairer, light yellow, and abundant, eyebrows and lashes not quite white, red reflex from pupils more marked than in 13, not much pigment in choroid, choroidal vessels can be seen up to edge of disc, no nystagmus, iris, V. and refraction as in 13. IV. 15, aged four, like 13 in everything except that hair is a shade less fair. IV. 16 died at six months. Father, aged 38 when IV. 13 was born. Mother (III. 14) of IV. 13—16, light hair, blue eyes, intelligent, has had goitre for two years, age not given but looks more than 40 in photograph. Hair- and eye-colour of others: fair, II. 1, 2, 10, 11, 12; III. 1, 2, 15; IV. 2, 7, 9, (II. 11 *very fair*): dark, including "reddish," I. 7; III. 16; IV. 3, 8, 10: "not fair," III. 18, 19; IV. 1, 10, 11, 17. Three males in III. (10, 11, 12) suffered from Leber's family optic atrophy and two in IV. (4, 5); in III. 10 and 11 it set in at about 30, in 12 age of onset not given; in IV. 4 it was present at 32 and in 5 at 25. The mother of IV. 4 and 5 (III. 7, sister of III. 10, &c.) has good sight, her husband was not her cousin. Mother of III. 7, 10, &c. (II. 6), who lived to be 84, was blind for a year and a half before her death; two of her brothers (II. 5)¹ and their father (I. 1) also had bad sight in old age. The nature of the senile failure of sight in these four cannot be ascertained. Nothing known about I. 3. (C. H. Usher.)

Fig. 131. Albinotic twins (III. 4 and 5) and an albinotic first cousin once removed (IV. 5). III. 4, aged 21 (1905), single, hair nearly white with a slight yellow tinge over all of it and has always been the same, eyebrows and lashes nearly but not quite white, iris blue but translucent, pupils red, fundus markedly albinotic, but choroidal vessels not visible at yellow-spot region and immediately around optic disc; lateral nystagmus (116), refraction H., degree not measured, V. $\frac{6}{36}$ each eye, no photophobia, colour vision normal; general health and strength fair, intelligence good, was third in class of 30 at school, musical. III. 5 resembles her twin sister in every detail, even to the exact rate of the nystagmus per minute, but is not so delicate in appearance and did rather better in school. Their siblings: III. 2, very fair, died at 12½ after influenza; III. 3, "hair much darker than the albinos"; 6, aged 20, about the same as 3. Father (II. 1), a saddler, first born of two, light hair. Mother (II. 6), very fair hair, blue eyes, good sight, died at birth of III. 6, was the eleventh of 13 of whom nine are dead. IV. 5, aged 12, discovered accidentally sometime after the two above described and his part of the pedigree then found to join theirs at II. 3; hair white, tinged yellow at ends, brows and lashes quite white, irides gray, pupils red, fundus very fair with the usual redder appearance at yellow-spot region, refraction H. As., 2 D. vertical, 5 D. horizontal, V. corrected $\frac{6}{36}$ but gets on well at school and delivers newspapers after school, lateral nystagmus 114, robust and intelligent and thought to be stronger than his siblings, skin not irritable. His siblings (IV. 6 to 9), aged from ten to two; 6 and 9, light brown hair and blue eyes; 7 and 8, hair and eyes brown. Father (III. 15), light brown hair. Mother (III. 24), dark brown hair, brown eyes. Hair- and eye-colour of others: fair I. 3, 4, 5, 6; II. 3; III. 10 very fair, "almost an albino"; fair 11, 12, 13, 14, 16 (15 see above), 18, 19, 20, 21, 22: light brown and reddish, II. 2, 4, 7, 14: dark, I. 1, 2; II. 2, 8, 9, 10, 11, 12, 13; III. 1, 17, 23: unknown, IV. 10 to 17. III. 11 and 12 died in infancy. At least three twin-births all descended on one side from I. 5 and 6. (C. H. Usher.)

Fig. 132. Two albinotic siblings (V. 16 and 19) out of six and a partially albinotic uncle (IV. 8). V. 19, aged 24 (1906), single, a complete albino with nystagmus, mixed As. and moderate defect of sight; right My. 1 D. nearly vertical, H. 2 D. in opposite meridian, V. corrected $\frac{6}{12}$; left My. 0.75 D. vertical, H. 3.5 D. horizontal, V. corrected $\frac{6}{24}$. V. 16, aged 30, single, albino, refraction As. Their siblings: IV. 17, aged 28, single, dark hair, dark gray eyes, refraction My. 1.5 D.; 18, aged 26, single, dark hair, brown eyes. Father (IV. 18), schoolmaster, brown eyes, aged 59. Mother (IV. 7), aged 63, hair formerly golden, now dark, eyes gray-blue, is first born of eight. The second (IV. 8), who died of typhoid at 24, was "very fair, fairer than" V. 19, but had good sight and steady eyes, *albinism of skin and hair only*; of the others 10, 11, 13 and 14 were fair, 10 being very fair, 9 had blue eyes but dark hair, 12 was dark. Hair- and eye-colour of others: fair, III. 4, 9, 12, 21; IV. 16, 21; V. 7, 23: dark, II. 4, 5; III. 3, 13, 14, 15, 16, 17, 18, 19, 20, 25, 27; IV. 1, 3, 17, 22, 27; V. 2, 5, 9, 14, 15, 20, 22, 25. (Dr. Burdon-Cooper, Case 2.)

PLATE XIX. Fig. 133. *Incomplete* albinism in a pair of children, their mother and her father. III. 3, aged 11 (1906), light blue eyes, hair flaxen fair, brows and lashes white, pupils have never been pink. III. 4, aged seven, light gray eyes, hair less coloured than 3, brows and lashes white. Sight probably good in both

¹ II. 5 should have been a large circle representing several of both sexes; two of these, males, had bad sight in old age.

but no note. Both children always very delicate. Mother (II. 8) was very fair when young but now less so; of her seven sibs three (II. 5, 6, 7) fair, four (II. 1 to 4) dark, all married and have families (III. 1 and 2) but none very fair; her father (I. 2) was very fair, her mother (I. 1) dark, both lived to 80. Father (II. 9) dark. (C. H. Usher.)

Fig. 134. One complete and one incomplete albino in a sibship of seven. III. 3, aged 21 (1905), hair, eyebrows and body hair flaxen, formerly still lighter; pupils were pink in early life, sight defective. (In 1903, when 19, C. H. Usher found high M. As., 5.5 D. vertical, 1.5 D. horizontal, V. corrected $\frac{6}{38}$, lateral nystagmus.) III. 2, aged 22, very fair but no defect of sight, married and has two children (IV. 1 and 2), neither very fair. The other five sibs (III. 4) not fair. Mother (II. 2), dark blue eyes and hair now rather dark but it was very fair in early life; she has a sister (II. 1), formerly very fair, none of whose nine children (III. 1) are very fair; her mother (I. 1) was fair, father (I. 2) dark. No other conspicuous fairness known. (C. H. Usher.)

Fig. 135. One albino in three (III. 3) and history of albinism in a cousin (II. 5). III. 3, aged 14 (1906), complete albino with rather slow nystagmus, high H. As. and considerable defect of sight; intelligent. III. 1 and 2, not fair. Father (II. 1), dark hair, brown eyes and both his parents dark. Mother (II. 2), brown hair, blue eyes, was first born of eight, all still living and all have families (*not shown*); her youngest sibling (II. 4), rather light "golden" hair; only one of the children of II. 3 and 4 was fair (now dead); the mother (I. 4), brown hair, now white, had at least two sisters, one of whom (I. 6) had an albino son (II. 5) who had a family, but has not been heard of for many years. (Mr Lang.)

Fig. 136. One complete albino with defective sight in a sibship of twelve. III. 4, fourth born, aged 17 (1906), hair, eyebrows and lashes quite white, nystagmus and bad sight. Most of the siblings more or less fair. III. 1, aged 23, fair golden hair; 2, aged 21, flaxen; 5, died in infancy, fair; 7, aged ten, hair moderately fair, eyes blue; 8, aged eight, and 9, aged six, rather darker than 7; 10, died at ten months, fair; 11, aged two, sandy hair; 12, aged six months, born with very dark hair, now quite fair; all the above have blue eyes; III. 3, aged 19, dark hair, dark eyes; 6, aged 12, "sandy" hair, dark eyes. Mother (II. 1) was formerly almost as fair as III. 4; her mother (I. 1), still living, was also very fair. Father, no note. (Mr Lang.)

Fig. 137. In this extensive pedigree of a professional family only one case of albinism has occurred at any rate during the last four generations. IV. 8, aged about 22 (1905), completely albinotic but well developed in every other respect and living a full life, was first examined when 8 years old (July 1891), when she had rather rapid lateral nystagmus, H. about 4 D. and V. corrected $\frac{6}{60}$, astigmatism not tested for, V. was the same in 1894. She is second of three; IV. 7, a medical man, had rather reddish hair originally; IV. 9, very dark. Father (III. 19), eyes grayish, hair formerly dark auburn now dark brown; his father (II. 8), red or sandy hair, "though most of his stock were dark"; his mother (II. 12), fourth born of six, dark hair and eyes, as had her next older sister (II. 14), the mother of the albino's mother. Mother (III. 24), very bright red hair turning later to bright auburn; her father (II. 15) had light hair and eyes. Hair- and eye-colour in others: IV. 10 and 11; III. 9, 10, 26, 28, 29, 33 (a twin) all more or less fair; V. 1, brown hair and eyes, and the six children (IV. 3), all dark. Thus there was a tendency to red or fair hair in both parents of the albino and in some relations of her father's father and her mother's father; but the two grandmothers of the albino, from whom the consanguinity was derived, were dark and are moreover said to be of a dark stock. (E. Nettleship.)

Fig. 138. Four albinos in sibship of seven, two or three earlier cases. IV. 1, aged 18, complete albino with nystagmus and albinotic choroid, refraction myopic with a little astigmatism; right, M. 8 D. vertical, 7 D. horizontal; left, 5.5 D. and 4 D. respectively, V. corrected $\frac{6}{24}$ to $\frac{6}{18}$. IV. 2, aged 15½, 6, aged five, and 7, aged five months, all albinos but no details. Father (III. 1), "born with white hair but has gone darker"; his mother's mother (I. 2) and her sister (I. 1) both had white hair. (Mr Jameson Evans, Case 2.)

Fig. 139. *Incomplete* albinism in both of a pair. II. 1, aged three, light hair, grayish-blue irides, rotatory nystagmus, photophobia; said to have been born with dark hair. II. 2, aged 1½ year, vertical nystagmus, irides "grayish-brown." Father (I. 1), fair hair when a child, now dark. Mother (I. 2), now dark, formerly lighter; her five brothers (I. 3), light haired; her two sisters (I. 4), dark. (Mr Evans, Case 3.)

Fig. 140. One albino in three. II. 1, aged 23 when last seen, albinism with blue-gray irides, nystagmus with high myopic astigmatism, M. 22 D. nearly vertical and 18 D. nearly horizontal, V. $\frac{6}{38}$ when 23; an earlier record gives lower figures, but this examination was clearly incomplete and affords no proof that the M. was progressive. Her two sisters and father have light hair. (Mr Evans, Case 4.)

Fig. 141. Complete albinism with pink pupils, albinotic choroids, nystagmus and some head-movements in one child of four. III. 1, aged eight, slight myopic astigmatism, V. $\frac{6}{38}$ to $\frac{6}{24}$. The three siblings (III. 2), mother (II. 2) and her father (I. 1) all fair-haired when young, but became dark after 20. Father (II. 1), dark. (Mr Evans, Case 5.)

Fig. 142. Two albinotic brothers, one with *partial* pigmentation of iris. III. 2, aged ten, hair was lighter (no note of exact colour when an infant but "is getting darker"), but is now about same "mousy" colour as his mother's; choroids very pale at periphery, fairly good colour in central region; irides gray, but the left has a small brown sector up-in; lateral nystagmus, mentally defective and does not know his letters. III. 1, aged 25, an albino, married, no children; no other details, and no information as to births between III. 1 and 2. Mother's (II. 2) hair light when young, now "mousy" brown; her father (I. 1) and albino's father (II. 1), dark hair. (Mr Evans, Case 6.)

Fig. 143. II. 2 and II. 3, when seen eleven and ten, both sickly condition, but girl stronger than boy; nystagmus, photophobia, iris red and pupils "hart roth, wie ein starker Nordschein." "Der schwarze Schleim (*pigmentum nigrum*)" wanting and "die Blutgefäße der Aderhaut deutlich"; skin and hair white and soft; boy had broken twice his left foot and once his left hand, all healed. I. 2, the father, a healthy man, blue eyes and gray hair; I. 1, his first wife, had ten children, of whom beside the albinos only II. 1, a youth of 17, blue eyes and fair hair, had survived. I. 1 had light brown hair and was a big woman; no albinos from other wife. (Karl Strack, *Medicinisch-Chirurgische Zeitung*, Salzburg, 1791, Bd. II. S. 376, "Beschreibung zweyer Kakerlaken die sich in Mainz befinden.")

Fig. 144. I. 1 and I. 2 had black hair and normally pigmented eyes. II. 1, complete albino with usual description, but a well-built, healthy individual. II. 4 died at three years of age. Sex of other children not stated. (Karl Strack, *Ibid.*, 1808, Bd. III. S. 413, "Nachricht von einem Kakerlaken.")

PLATE XX. Fig. 145. One incomplete albino (IV. 10), with congenital ptosis, in a sibship of eight, the issue of second cousins. IV. 10, seen at age of six in 1903 and again when nine in 1906, hair very light, skin blond, irides blue, no note of red reflex from pupils, constant rotatory nystagmus, "fundi not particularly light," congenital ptosis of L. upper lid; refraction, R., high H. As., H. 2 D. vertical, 6.5 D. horizontal; L., slight mixed As., M. 1 D. vertical, H. 0.75 D. horizontal, V. corrected $\frac{6}{9}$ partly when aged nine; is fifth born of eight (IV. 6 to 13); fourth (IV. 9), fair hair, but not albinotic; all the others brown or dark hair and eyes and dark choroids; IV. 6 died at one week, 11 and 12 died at age of eight months of peritonitis and acute lung disease respectively. Father (III. 8), dark hair, blue eyes, dark choroid; he is fifth of ten siblings, all dark, of whom eight are living. Mother (III. 18), dark brown hair, dark irides and choroids; a twin with 19, who is also dark; she is fifth child of her father's 12, but the first of her mother's (his second wife's) eight. Colour of hair and eyes in others: fair with blue eyes, III. 14 and five of her seven children (IV. 16), the other two not being dark, III. 21 and his two children (sons); fair or reddish hair and blue eyes, III. 26 and 30 and IV. 32. In Gen. I. the siblings 4, 5, 6, 7 and 8, all fair; 4 married 7 and had six children (II. 17 to 22), all fair; II. 18 indeed had quite white hair but good sight, she died at 80 unmarried; I. 5 married 1 (his complexion unknown) and had four children, of whom the second (II. 2) had white hair, the others dark; II. 2 was first cousin to 17 to 22. The albino IV. 10 was great-nephew to II. 2 and II. 18. Dark, II. 1 to 16 (except 2), III. 1 to 13, IV. 1 to 15 (except 9 and 10), I. 11 and many of her descendants. (C. H. Usher.)

Fig. 146. Two complete albinos in a sibship of five. V. 17, aged 27 (1906), carpenter; hair, eyebrows and lashes quite white, irides blue, red reflex through irides, rapid lateral nystagmus (100 a minute), fundus very light with the usual characters, refraction H. but degree and exact V. not given, can read the smallest print, skin blond, well grown and healthy except for liability to asthma. V. 19, aged 24, carpenter; complete albino like his brother, but irides gray (not blue), transmit red light, nystagmus more rapid (120 per minute), refraction and V. as in brother; well grown, strong, has had no illnesses; both these albinos unmarried. V. 16, aged 28, single, hair, irides and choroids dark; 18, died at six months old; 20, dark hair and eyes. The albinos born at full term, mother's health having been good; not more than the five conceptions. Father (IV. 7), hair was brown (now gray), eyes blue. Mother (IV. 26), blue eyes, but hair darker than any of her five siblings. Complexion in others: father (IV. 7) had five siblings, all with blue eyes and four of them fair hair; his mother (III. 9), fair hair and none of her five siblings dark; his father (III. 2) and all his siblings, dark hair but blue eyes; father's ascendants (II. 2 and 3), blue eyes, and I. 1 was known as "white Michael," meaning either white hair or decided relative fairness amongst dark relations. Hair fair, eyes blue in nearly all of V. 1 to 15 and 21 and 22 and 30 to 32. Mother (IV. 26), youngest of six, all blue eyes but none very fair; her mother (III. 17) and sibs (III. 16, 18, 19) all fair or very fair. Dark hair with blue eyes in II. 1 and many of III. 1 to 13, and of IV. (C. H. Usher.)

Fig. 147. Three albinos in a small pedigree from Norway. II. 5, albinotic boy, aged seven (1876), quick and intelligent. II. 6, albinotic girl, died aet. two years ("inflammation of brain"). II. 4 was still-born, not an albino; 7, living, normal. II. 2, albino, sex not stated, first cousin of 5 and 6. II. 1 and 3, several siblings of 2, none albinotic. No family history of albinism; careful enquiry. (Koren, *Norsk Magazin f. Lægevidenskaben*, Vol. 6, Part 4, pp. 46—48, 1876, Case 1.)

Fig. 148. Two children albinotic out of three. Father dark, mother not fair. No other albinos known in the family. (Koren, *Ibid.*, Case 3.)

Fig. 149. Three albinos born in succession in a large sibship; two (II. 2 and 3) were living in 1876, II. 4 was dead. Exact number of siblings not stated. (Koren, *Ibid.*, Case 2.)

Fig. 150. The father (I. 2) had black, the mother (I. 1) brown hair. The two older sons and the four younger daughters all had so-called black hair. The albino, Johann Hillebrand, b. 1770, was examined by Siebold in 1787. He had all the hair, skin and eye characters of the complete albino. Healthy, sweated easily and heavily and got through small-pox easily. Read with book in an unusual position as reported of other albinos "Will er lesen, so muss er das Buch quer halten, so das die Zeilen aufwärts laufen" see our Plate O. According to Siebold, his parents reported that he was blind for six months after birth, they said he had "no pupils" and that these only appeared after six months. This is one of the cases on which the persistence of the *membrana pupillaris* in albinos has been based. The mother said to have been frightened during pregnancy by a white rabbit with pink eyes. (Siebold, Von einem Kackerlacken in Würzburg, Blumenbach's *Medizinische Bibliothek*, Bd. 3, Erstes Stück, S. 161.)

Fig. 151. Completely albinotic boy, watched from one to five years old (1892—1897); nystagmus, refraction said to be Em. and V. $\frac{6}{80}$, fundus normal but albinotic. One older child (II. 1) normal; doubtful whether any younger than the albino. (Bohn, "Ueber angeborene...patholog. Pigmentierung am Bulbus," *Inaug. Diss.*, Giessen, 1902, p. 4.)

Fig. 152. Albinotic girl, aged $12\frac{1}{2}$ (1902), the only issue of her parents. No details. (Bohn, *Ibid.*)

Fig. 153. Incomplete albinism in a child of eight (1902), sex not given; rotary nystagmus, V. $\frac{6}{80}$, no note of refraction. No other cases known in family. Doubtful whether the albino had any siblings. (Bohn, *Ibid.*)

PLATE XXI. Figs. 154—175. The pedigrees are drawn from Arcoleo's data, pp. 584—5. Namely, our 154—159 = his 1—6 in order; our 160 = his 7 and 8; 161 = 9; 165 = 10 and 11; 162 = 12; 166 = 13; 163 = 14; 164 = 15; 167 to 175 = 16 to 24 respectively. The data given by Arcoleo are very meagre. It is difficult to believe that the pedigrees have been closely followed up, for we have in no such long series of cases failed to find albinism in ancestors or in parents' collaterals. We have supposed the albinism in every case complete, but there is no detailed description of the individual albinos. As Arcoleo was on the look out for consanguinity, we may suppose that in the majority of cases where we have put "no consanguinity recorded," the parents were at least not first cousins. In Figs. 168, 170, 173, Arcoleo was unable to ascertain whether there were other children in the albino sibship. In Fig. 175, II. 1 was apparently the first child. Accordingly in Figs. 168 and 173 the symbol should have been \bigcirc ? and not \odot .

The only statement as to eyes is that there are seven hypermetropic cases in the mother's stock in Fig. 155, and these include the mother and one of the two living albinos. In Fig. 158 the ancestors are said to have been "tutti bianchissimi," which may have meant, either, as we have often found, partial albinism, or the characteristic *lys-blond* of the Norse, which itself is occasionally associated with albinotic stocks. Fig. 162 adds a case to our fairly large collection of twins, with one albinotic and one normal. The albino II. 1 in 169 is said to be sterile. Arcoleo illustrates the belief in prenatal impression in the cases Figs. 159 and 164. In the first case the husband felt great sympathy for "una albina di belle forme," and he induced his wife to make a friend of her, and both are said to have desired children like her, and to have then had albino children. In the second case, an attendant on an albino family promised when she was married to have an albino child and did so at her first confinement. Probably the only reasonable conclusion to be drawn from such statements is that albinos were known to be very intimate with those who were the real or putative parents of albino children. (Arcoleo, *Encicl. Medica Italiana*, Art. "Albinismo," Vol. 1. pp. 582—591. Republished in *Archivio per l'Antropologia*, T. 1. p. 367, 1871.)

Fig. 176. One complete albino in a sibship of two born to first cousins. IV. 1, aged three (1907), typical albino, coarse lateral nystagmus, photophobia; fundus normal except for lack of pigment; refraction H. about 2 D. Born at full term. IV. 2, aged ten months, dark brown hair, irides dark blue-gray. No other conceptions. Father (III. 11) fair golden hair, blue-gray eyes; was nearly the youngest of 17; 11 died in infancy and nothing is known of them, two girls, both older than III. 11, died at 12 and 20 respectively of typhoid, three living besides III. 11, all male all dark hair and "hazel gray" eyes. Mother (III. 5) very dark hair, is seventh in a sibship of eight, all with good sight; eldest (III. 1) fair hair and blue eyes, all the others dark hair (one black) and either brown or gray eyes. Hair- and eye-colour of others: fair: I. 3; II. 6, 7, 9. Dark: I. 1; II. 1, 2, 4, 5, 8, 10. Father's father (II. 3) fair, a brother of mother's father (II. 2) who was dark. (Dr Gray Clegg, Case, B....)

Fig. 177. Four perfect albinos in a sibship of 9 (III. 7 to 15), of whom 8 including all the albinos, are living and all well developed and of average intelligence; III. 11 died aged 13 months of whooping cough. III. 7, aged 23 (1907), domestic servant, not seen, hair said to be white and eyes to roll and are said to have rolled more when a baby; wears coloured spectacles for My. As. -2 D. sphere with -6 D. cylinder, axis horizontal. III. 12, aged $10\frac{1}{2}$, complete albino with all the typical appearances; refraction My. 11 D. nearly vertical, 10 D. nearly horizontal, V. corrected $\frac{6}{18}$; fundus very albinotic but normal; hair white, the faintest tinge of yellow; eyelashes pure white. III. 14, aged 6, albinism as complete as in 12; hair, lashes and fundus exactly as in 12; refraction My. 8 D. vertical, 7 D. horizontal, V. corrected $\frac{6}{38}$. III. 12 and 14 are in a blind school. III. 15, aged 3, albinism exactly the same as in 12 and 14; fundus shows no trace of pigment; refraction simple My. As. 2 D. in each eye, axes oblique. III. 8, 9, 10, all have blue eyes and hair from quite fair in 8 aged 21 to brown or "mouse-coloured" in

10; V. and refraction in these three not known, but all see well and have steady eyes. III. 13, aged 9, seen; irides blue spotted with yellow giving a greenish effect; hair "mouse brown"; refraction H. As. 2 D. oblique axes, V. corrected $\frac{6}{12}$; fundus well pigmented and normal. Mother (II. 4) "mouse" hair and blue eyes; deaf from scarlet fever at 3 years old; is 3rd born of 11; aged 45 (1907). Father (II. 14) age not given; hair rather fair, eyes blue, is a railway signalman. Of II. 2 to 12 eyes blue in all (including 4 above); hair fair to auburn in 2, 7 and 10; not really dark in any; of the 11, 4 are living, 1 died at 26, 1 at 17, 1 at $2\frac{1}{2}$ years, 1 at 2 months, and 2 (the twins) still-born. In Gen. I. 4 was the only decidedly dark one; of the remainder in II. and III. several are fair or auburn or moderate, not many dark: all have steady eyes; III. 1 all died young. No consanguinity between II. 4 and 14. (Mr N. Bishop Harman.)

PLATE XXII. Fig. 178. Two complete albinos (II. 2 and 3) in a sibship of four, all living; all appearances typical. Photophobia, nystagmus and defective V., refraction not measured but probably myopic. Ages, nine and six years, health good. They are the second and third in the sibship. No other albinism known in the family. (Dr Casey A. Wood, *Transactions of Montreal Med.-Chirurg. Soc.*, 1883—5, p. 47.)

Fig. 179. Three albinos in two generations. III. 1, aged $2\frac{1}{2}$ years, completely albinotic and appearances typical. Photophobia and nystagmus; refraction H. 2.5 D. in R., H. As., 2.5 D. in L.; child otherwise normal. III. 1 has two sibs, one (III. 2) died at one week old, the other (III. 3) aged six months, is living. Father (II. 9) dark; mother (II. 8) fair; she had one brother, who died in childhood, and five sisters, two of whom (II. 6 and 7) had white hair and "weak" oscillating eyes. The four grandparents (I. 1 to 4) reported to have been normal. (Dr Casey A. Wood, *Ibid.*)

Fig. 180. Four albinos in a sibship of eleven¹. Male (III. 8) aet. 73 (1908) seen, nice very intelligent crofter under medium size, only sibling alive in sibship of eleven; married but no children; skin reddish without freckles; hair white, same all over body; eyes blue, pupils red; constant nystagmus; vision defective; III. 3 an albino ob. 67 years, married, had three children (IV. 1, 2, 3) with brown hair; III. 6, female albino ob. 7 years; III. 9 male albino ob. 16 years scrofula or consumption; other members of sibship III. 2 to 10 (III. 2, 5, 10) had fair hair when young and fair complexion, none married; mother (II. 5) hair brown, eyes brown; father (II. 3) hair fair when young, eyes blue; maternal grandfather (I. 3) hair red; I. 1, 2 and 4 no information as to hair and eyes, but no relatives far or near were albinos as far as known; paternal uncles and aunts (II. 1, 2 and 4) were fair; some maternal uncles and aunts (II. 6) were fair, also some descendants (III. 1 and 11) of these had more or less fair hair. (Dr A. McKecknie through C. H. Usher.)

Fig. 181. Three albinos in one sibship associated with idiocy. II. 1, sensible, bright girl (E. K.) aet. 7 ("lately"), well-marked albino, hair almost quite white, iris and pupil pink; nystagmus lateral; refraction R. My. 3.5 D. vertical, Em. horizontal, V. corrected $\frac{5}{10}$, L. My. 2 D. vertical, H. .5 D. horizontal, V. corrected $\frac{5}{10}$; II. 3, girl (L. K.) aet. 4, partial idiot, defective vision, small posterior polar cataract; hair, brows and lashes quite white; refraction My. astigmatism about 2 D. II. 4, boy (F. K.) aet. 2, backward in walking and talking, "queer" in his ways, is albino, nystagmus slow lateral. II. 2, boy (C. K.) aet. 5, not albino, hair and eyes brown; refraction R. H. 1.5 D. vertical, 3.5 D. horizontal; L. H. 3.5 D. horizontal, Em. vertical. Father (I. 1), hair almost black, eyes blue, and mother (I. 2), hair and eyes brown, are first cousins. There are no albino relations on either side of the family. (Dr T. Harrison Butler, *The Ophthalmoscope*, Vol. vi., Aug. 1908.)

Fig. 182. Shows transmission of quite fair hair and blue irides in the direct female line through five generations, one transmitter, however (III.), being dark. In V., the first born, a girl aged 5 (V. 1), has very fair hair and blue eyes; her two younger brothers have light hair, but brown irides and dark eyelashes. (Dr Gray Clegg, Case 1.)

Fig. 183. Two complete albinos (III. 3 and 7) in a sibship of eight, aged 23 and 16 respectively; nystagmus, no details of vision. Two of III. 2 died at six months and two years respectively, and 6 died at thirteen from an accident. III. 5 and 6 and one of 3 have brown hair. Father (II. 6) married at 21; dark, as were his parents and all his known relations. Mother (II. 4) married at 19, died of influenza at 36; sandy hair; was probably fourth born of five; her parents (I. 1 and 2) and her siblings all dark. No consanguineous marriages from the grandparents downwards. No other albinos known in the family. Albinos were born at full time. (Dr Gray Clegg, Case 2.)

Fig. 184. Prevalence of very fair hair and blue eyes. IV. 5 born with quite white hair, now aet. 21 and hair still quite fair. IV. 6, aged five (probably the youngest of the sibship 5—12), very fair hair. All the rest of IV. are fair in degrees, and all have blue eyes. Father (III. 10) sandy hair. Mother (III. 9) now 48, hair was very fair, and is still light; she had two very light-haired brothers (1 and 2), and six other sibs all fair or medium; all the nine have blue eyes; their children (IV. 1 to 4) all fair, though the fathers of IV. 2, 3 and 4 were dark. In II., 2 was fair and so were 3 to 8 with one exception; the children of II. 8, also fair. I. 1 and 2 were both light. (Dr Gray Clegg, Case 3.)

Fig. 185. Two complete albinos (IV. 2 and 4) with the usual conditions, including marked nystagmus, in a sibship of five; both are successful professional men. Refraction of IV. 2 (aged 48 in 1907), My. 5 D.

¹ III. 10 represents two individuals and should be (2).

vertical, 3 D. horizontal in R., V. corrected $\frac{6}{80}$, in L. My. 2 D. without proved As., V. corrected $\frac{6}{30}$. IV. 4, aged 41, refraction My. 8 D. with some As., V. corrected $\frac{6}{80}$. The other three siblings (IV. 3, 5, 6) and the husband (7) and two children (V. 1) of IV. 6 and the parents (III. 3 and 4) and other members of III., all dark. The four grandparents (II.) normal and not albinos. I. 1 said to have had white hair, but whether this was albinotic or only senile cannot now be ascertained. Parents (III. 3 and 4) both aged 25 at marriage. IV. 2 born five years and IV. 4 eleven years after marriage. IV. 4 married 13 years but no issue. (Mr Marcus Gunn.)

Fig. 186. One albino in three children. III. 2 seen at age of ten (1902), and again 15 (1907); hair very nearly white but with slight yellow tinge; irides pale pure blue and transmit some red light from fundus in daylight; pupils decidedly red in daylight; nystagmus; refraction H. As., in 1902 H. 2.5 D. vertical, 7 D. horizontal; 1905, aet. 13, H. 0.5 D. vertical, 4.5 D. horizontal, V. corrected $\frac{6}{80}$ on each occasion; well grown and healthy, intelligence moderate; hair was exactly same colour at birth as now. His siblings, III. 3, aged ten (1907), dark brown hair and eyes; III. 4, aged 15 months, hair light, rather golden brown, and is getting darker, eyes gray-brown, and mother thinks are turning browner; 3 and 4 were born with brown hair. Mother (II. 3), aged 38 (1907), eyes brown, hair now dark, was formerly light; has seven siblings, of whom six have brown hair and eyes, but one, fifth born (II. 4), aged 30, has blue eyes and hair formerly "white" and still fair. Her father (I. 2) fair, mother (I. 3) blue eyes, dark auburn hair. Her first cousin (II. 1), aged about 45, has always had and still has hair as light as the albino III. 2, but steady eyes and good sight; his children (III. 1) fair. Father (II. 6) had yellowish red hair, now darker and very blue eyes; his three siblings (II. 7) all fair and their children believed not to be dark. His mother (I. 4) fair; father (I. 5) said to have had black hair and blue eyes. No consanguineous marriages known. (Mr Holmes Spicer.)

Fig. 187. A complete albino female in a sibship of three. No other case of albinism known in either family. Father and mother not related. (Dr E. Stainer, May 12, 1905.)

Fig. 188. III. 2, a complete albino male of very considerable intellectual distinction. No trace whatever of albinism on father's side. Mother (II. 2), brown-haired. Mother's sister (III. 3), complete albino; the grandparents (I. 1 and 2), dark haired; no knowledge of any further albinotic ascendants. Several of the cousins (III. 4) very fair, although not white haired. One daughter of the albino very fair like some of III. 4, and one child said to be defective. Information very difficult to obtain. Origin of family, Yorkshire. (K. Pearson.)

Fig. 189. Two female albinos in a sibship of four. Both died before 20. Family tradition says that there had been no trace of albinism before or since, but that it was due to I. 2 being frightened by an albino before birth of II. 1. III. 1 not a complete albino in eyes, but "very colourless in eyes and eye-brows," was the informant and very reticent. Some of the cousins, especially III. 3, have black hair. Origin of family, Essex. (K. Pearson.)

Fig. 190. II. 1, aged 25, man of science, complete albino in a sibship of three. II. 2 and 3 as well as I. 1 and 2, the parents (who are first cousins) have brown hair and brown skin (*de la peau brune*). II. 1 is astigmatic R. and L. V. $\frac{2}{30}$. (Dr Emile Berger, Paris.)

Fig. 191. III. 1, albinotic boy, aged 2, hair and eyebrows perfectly white, well-marked horizontal nystagmus; no iridial or choroidal pigment; fundus in other respects normal. Well nourished and healthy, but has had some ear trouble. Mother (II. 12) aged 25. Hair moderately dark brown, gray eyes. Good health, has no other children and had no miscarriages. Knows of no case of albinism in her family. Father (II. 11), aged 37. Eyebrows white and have always been so; hair light brown, eyes dark blue. On ophthalmoscopic examination fundi appeared normal, but choroidal pigment was scanty. He has six brothers and four sisters all very fair; two of the brothers have white eyebrows and three blue eyes. *His wife and he have no kinship*. II. 11 says there were never any albinos in his ancestry, but when examined was not very lucid in his statements. (Dr M. Greenwood, Jr.)

Fig. 192. One marked albino (III. 2) in a sibship of four, now (1906) aged 17. His only surviving sibling (III. 3), aged 10, fair hair, blue eyes, is normally developed; the other two (III. 1 and 4) died of convulsions at about six months old. Mother (II. 1) dark hair, pale gray-brown eyes; father (II. 2) sandy hair; he only once saw his father (I. 1) and believes he had white hair. No consanguinity. (Mr Snowball, Case 8.)

PLATE XXIII. Fig. 193. Six albinos in two generations. IV. 2, aged 10 (1905), albino with nystagmus. IV. 3, aged nine, albino with nystagmus, H. As., H. 1.5 D. and 4 D. in the opposite meridians, V. corrected $\frac{6}{12}$. IV. 4, an albino girl, died at eight days (twin to non-albino boy). IV. 7 albino aged $3\frac{1}{2}$. In two of these three the position of rest of the eyes is to the left, in the other to the right. IV. 11, an albino second cousin, with pink eyes, also affected with double congenital ptosis, sex not mentioned, died at 17 months. III. 10 has fair hair, blue eyes and nystagmus, and has "very myopic" "weak" eyes. IV. 1 and 5 (a twin with 4) red hair. IV. 6 light hair. IV. 8, 9, 10, 12, 13 good eyes but colour not stated. Complexion of others: Father (III. 9) fair with blue eyes; all his sibs (except III. 10, albino)

are blond with blue or gray eyes. Mother (III. 5) red hair, blue-gray eyes, fair skin; of her four sibs, one (sister) rather dark hair, the others light reddish or yellowish hair. No positive information of colour of hair and eyes in I. and II., but no albinism known. No consanguinity anywhere. The albinos born at full time, and health of mother (III. 5) good. (Dr S. C. Ayres, Cincinnati, U.S.A.)

Fig. 194. IV. 1, the only child, aged 14, well grown and otherwise normal (1905), hair of head, eyebrows, lashes and axillae whitish-yellow, light blue transparent irides, horizontal nystagmus; refraction H. As., degree not given, V. $\frac{1}{8}$. Father, II. 2, light blond, refraction H. As. V. $\frac{1}{2}$. Mother, II. 1, black hair, refraction H. V. $\frac{3}{4}$. History of other relatives negative. (Dr P. V. Richter, Hamm in W., Germany.)

Fig. 195. Three living albinos in a sibship of 12; *there were two others, who died, and have been omitted from the figure by mistake, making five in all.* III. 1, aged 38 (1906), a master marble mason, albino, with high H. As. H. 5 D and 8 D. in the chief meridians, V. about $\frac{1}{7}$ each eye. III. 2, aged 31, albino with nystagmus, refraction H. 7 D. and V. $\frac{1}{12}$. III. 3, aged 25, albino, with nystagmus, refraction (rough estimate) H. 3 D. and V. $\frac{1}{8}$. No consanguinity of parents or grandparents, and no cases of albinism known in ascendants. Mother (II. 1) and her mother (I. 1) were married at 16, and the mother (I. 3) of father (II. 2) at 19. II. 1 was between 18 and 19 when III. 1 was born. (Dr M. H. Post, St Louis, U.S.A.)

Fig. 196. One complete albino (II. 1) aged 18 (1895) in a sibship of nine. Lateral nystagmus. High As., Right mixed, My. 1 D. vertical, H. 4 D. horizontal, Left H. As. H. 2.5 D. vertical, 7 D. horizontal; V. of each corrected $\frac{6}{32}$. No other albinos known in the family. (Mr Lawford.)

Fig. 197. First child of parents married 18 months. Child (IV. 2) aged 5 months (1905), typical albino with lateral nystagmus. Father (III. 3) dark blue eyes, hair moderately fair but formerly much fairer, married at 35. Mother (III. 2) moderately fair, married at 28. Father's three siblings (III. 4 and 5) all fair. Mother's five siblings (III. 1) all rather dark; her father (II. 3) very fair. Other ascendants in II. and I. not markedly fair so far as is known. No consanguinity of parents. No other congenital defects in family. (Mr W. Ilbert Hancock, Case 1.)

Fig. 198. Two out of three siblings albinotic. III. 2, aged 12 (1905), hair now almost white in some parts but yellowish-brown in others, "is getting much darker" but was quite white as a child; slight nystagmus, marked photophobia, refraction M. As., M. 5.5 D. vertical, 1.5 D. horizontal, V. corrected $\frac{6}{24}$ partly, each eye, fundus albinotic. III. 3, aged ten, hair much fairer than sister but is beginning to colour, slight nystagmus and less photophobia than sister, fundus albinotic, refraction H. As., H. 2 D. vertical, 4 D. horizontal, V. corrected $\frac{6}{18}$. The only other child (III. 4), aged 6, dark; no other conceptions. Father (II. 5) now quite dark haired but as a child hair was "almost white"; his four sibs (II. 6 to 9) all medium hair; three of them are married for 4, 12 and 16 years respectively and have four children (III. 5 to 8) of whom one at least is dark; his mother (I. 3) blue eyes, darkish hair. Mother (II. 4) and her three sibs (1, 2, 3) and the only child of one of them (III. 1) all dark. None of the four grandparents (I. 1 to 4) were fair. (Mr Hancock, Case 2.)

Fig. 199. One complete albino in a sibship of four, III. 2 aged 15 (1906); refraction My. 18 D. in Right, V. corrected $\frac{6}{60}$, My. 22 D. in Left V. not $\frac{6}{60}$. Her three siblings, of whom III. 4 died at six months, all dark. Father (II. 4) and his four siblings dark; none of their children (III. 5 and 6) or parents (I. 3 and 4) fair. Mother (II. 3) and her four siblings (II. 1 and 2) were all very fair, now darker; her parents (I. 1 and 2) not fair. No consanguinity. No other albinos known in the family. No other congenital defects. (Mr Hancock, Case 3.)

Fig. 200. Two albinotic Malays (II. 1 and 2) whose parents were dark brown pure-blooded Kelantan Malays. The albinos lived to be young adults and died in an epidemic more than 20 years ago. It is uncertain whether they had siblings. (Dr John D. Gimlette, Kelantan, Singapore, Case 1.)

Fig. 201. Three albinos in a Malayan pedigree. IV. 1, aged five (1906), skin fair and pink all over, and easily becomes irritated by exposure to sun; hair white getting yellowish towards the ends; irides filmy white, sclerotic and conjunctiva no brown tinge as in normal Malays; pupils garnet-red and irregular in shape; photophobia. She is the only child of her parents; they were divorced after her birth. II. 7 and 8, albinotic great aunt and uncle of IV. 1; II. 7 died; II. 8 living and has one child, normal (III. 3). All the others shown in the pedigree were normal Malays. Parents (III. 1 and 2) distantly related but not first cousins; father's parents (II. 3 and 4) first cousins. I. 1 and 2 were not related by blood. (Dr Gimlette, Case 2.)

Fig. 202. Two Malayan albinos, brother and sister, both living (1906). II. 1, aged 35; skin pale pink, hands and feet specially clear pink; body generally spotted over the pink groundwork with pigmented spots which are roughly circular; their size not stated; the colour seems to follow the wrinkles of the skin; his skin easily peels from sun-heat. Hair of head shaved but is pure white at the roots; body-hair very pale straw-colour; whites of eyes pure white, not tinged as in normal Malays; iris dull blue with some brown spots (in colour like the spots on the skin), pupil black; photophobia; says his skin has been spotted as long as he can remember. "The mole-like spots on his skin were sufficiently close together to make the general appearance of the body, viewed from a distance, somewhat like that of an

ordinary Malay suffering from scabies or other macular skin disease." Health good but muscular strength below the normal. He has had two children (III. 1 and 2), of ordinary Malay colour; both are dead. II. 2, aged 15, reported to be like I. 1 in appearance. No information as to any siblings between 1 and 2. Parents (I. 1 and 2) ordinary Malays. (Dr Gimlette, Case 3.)

Fig. 203. Three albinos (II. 1, 2, 3) out of four children of pure normal Malay parents (I. 1 and 2). II. 1 died at eight years old, and II. 2 at six. II. 3 living, aged four (1906), had white hair of the head and white eyebrows and eyelashes and the whites of her eyes are pure white, and is photophobic; health good. II. 4 living, aged two years, normal. No history of other albinos in the family. (Dr Gimlette, Case 4.)

Fig. 204. One albino in a sibship of seven. IV. 7, aged 19 (1907), typical albino with all the usual conditions, and hair almost pure white; refraction H. As., Right H. 2.5 D. nearly horizontal, 5 D. nearly vertical, Left H. 2.5 D. and 6 D.; was born at full term. IV. 2 gray eyes, dark hair; 3, died at seven of pleurisy, had light auburn hair; 4, aged 27, blue-gray eyes, light auburn hair; 5 and 6 still-born at full term, had dark hair; 8, aged 18, brown eyes, black hair. Father (III. 7), aged 56, married at 22, dark hair and eyes; was the youngest of three, all dark. Mother (III. 3), aged 58, married at 24, blue-gray eyes, dark brown hair, was out of health for a long time, from overwork and worry, between Nos. 4 and 5 when about 31; she was the youngest of three or four; one had golden hair, the others dark. Most, if not all, of II were dark, as are IV. 9; no information about IV. 1. (Mr Herbert Parsons.)

Fig. 205. A completely albinotic child, aged one year, *only* child of parents both dark, natives of Pembrokeshire; no pigment peculiarities in grandparents, great-grandparents or other relatives. (Mr M. B. Jefferiss, *Lancet*, 1872, II. p. 294.)

Fig. 206. A remarkable pedigree in which two brothers married their first cousins, daughters of two different brothers of their mother. The elder brother (III. 2) had 15 children of whom nine males and one female were albinos; the younger (III. 3) had eight children of whom one male and two females were albinos. The infant seen had very light flaxen hair, very pronounced nystagmus and almost complete absence of pigment in iris. Several of the 15 siblings had died early, but the nine other albinos had been born with the same marked albinotic symptoms. The mother naturally attributed the albinism to the cousin marriage. (Dr E. Stainer, Great Ormond Street Hospital, Oct. 26, 1900.)

PLATE XXIV. Fig. 207. Two albinos in a sibship of four. V. 1 aged six (1906). Complete albino, red pupils, horizontal nystagmus, refraction apparently only slight H., V. $\frac{2}{30}$. V. 2, aged five, similar albinism but iris perhaps a trace of pigment, refraction apparently slight My., V. with - D. $\frac{2}{10}$, nystagmus, horizontal and rotatory. Their two siblings (V. 3 and 4) aged three and two years not fair. Father fair, aged 35. Mother darker than father, aged 32. One uncle of the mother (II. 9) has very light hair, but no nystagmus and probably good sight; no albinism in any of the others shown in the pedigree nor so far as is known in any earlier ascendants. No consanguineous marriages. No other congenital defects. (Professor W. Koster, Leiden, Case 1.)

Fig. 208. Two albinos in a sibship of six. II. 1, aged 29 (1906), albinism not quite complete; II. 4, aged 23, albinism complete, with red pupils, nystagmus and bad sight. II. 5 died at 18, phthisis, the other three siblings living, 6 being 13. Parents dead. No consanguinity. (Professor Koster, Case 2.)

Fig. 209. Three complete albinos. Normal woman (I. 2) had by her second husband an albino son and daughter (II. 4 and 5) out of a family of four. The albino son married to a normal woman has six normal children. The mother (I. 2) by her first husband had an albino son, but the size of this first family is not stated. There is no record of consanguinity. (Mr J. F. Streatfeild, *Lancet*, 1882, I., p. 303.)

Fig. 210. Four complete albinos in a sibship of seven. All the albinos (III. 2, 3, 4, 5) living, aged 60 (1906), 56, 54, 52; sight bad in all. III. 4 seen and photographed; all the typical appearances of complete albinism, refraction H. As., H. 8 and 10.5 D. in chief meridians, V. $\frac{1}{80}$; colour vision good, fundi typical; is married and has four children of whom the eldest (IV. 1) is rather fair, the others not. Parents (II. 5 and 11) living, aged 88 and 90, knew their parents (I.) and grandparents and never heard of albinism except in III. (Professor Koster, Case 3.)

Fig. 211. Four, perhaps five, albinos in an extensive pedigree, one of them with two congenitally deaf-mute non-albinotic brothers. III. 5, aged 86 (1906), complete albino with red pupils, and light gray irides; no nystagmus; refraction high H. (wears + 7 D. constantly and with them sees $\frac{6}{60}$, not examined for As.), Left incipient cataract, Right lens normal; strong, active, cheerful and mentally alert; plays the violin at parties, &c.; is fifth of seven; the 4th (III. 4) now dead, was also an albino, with nystagmus. V. 7, aged 29 (1906), unmarried, a nearly complete albino with nystagmus; first seen by E. N. at Moorfields Hospital in 1886, aged nine, refraction then mixed As., My. 1.5 D. vertical, H. 2.25 D. horizontal, V. corrected $\frac{6}{18}$ each eye; is first born of seven, all males (7 to 10); the second and seventh of the sibship (V. 8 and 10) are deaf-mutes from birth, not albinotic, bright and intelligent, educated at Margate Asylum for Deaf and Dumb boys. VI. 2 is an albino, still a child; his sister (VI. 1) is fair, and his cousin (VI. 3) "very fair." Complexion of others: fair IV. 2, 3, 4, 6, and 5 auburn; VI. 1; II. 1, II. 2 red whiskers. Dark, IV. 1, 7, 8, III. 1. No consanguinity anywhere. The father (IV. 13) of the

sibship V. 7 to 10 containing two deaf-mutes and an albino, was the seventh of ten, three ♂, seven ♀; from one of his brothers have been obtained the particulars of his parents and their collaterals (his father was an only child, his mother had several siblings all but one of whom had issue), of his own nine siblings, his own three children all living and of the children of the only two of his siblings besides IV. 13 who married; these were two of his sisters, one of whom had six children, the other had ten or twelve all of whom died. Enquiry has been made and it is stated that none of the above ascendants, collaterals or descendants of IV. 13 were born deaf and none were albinotic. (Mr George Wherry, Case 1.)

Fig. 212. One albino (V. 2) in a large pedigree with complicated consanguinity. V. 2, aged 34 (1906), is an albino with nystagmus and My. 10 D. (As. not examined for), V. very defective especially in left which has been damaged by iritis; intelligent and is able to manage a small shop. He is second of seven; V. 1, still-born 15 months before the albino; V. 3, born 15 months after the albino, fair with light eyes, married, no issue; 4, two years younger than 3, not fair, has one child (VI. 3) fair; 5, 15 months younger, not fair, has one child (VI. 4) dark; 6, 18 months younger, dark, has two children (VI. 5 and 6); 7, miscarriage or still-birth. The albino (V. 2) married IV. 2 his *second cousin once removed* and has two children (VI. 1 and 2) aged nine and four, the latter fair. No prevalence of fair hair or eyes. Mother, IV. 4, dark, "was half a Jewess" and was one of 16; nothing known of the descendants of any of her sibs. (Mr Wherry, Case 2.)

Fig. 213. Three complete male albinos in a sibship of six. The albinos were 1st (aged 12), 2nd (aged 10) and 4th (aged 5) in succession. The third, fifth and sixth were dark. The albinos had horizontal nystagmus and myopia. No albinism for three generations in father's family and none known in mother's. No record of consanguinity. (Mr J. F. Streatfeild, *Lancet*, 1882, i., p. 303.)

Fig. 214. One male (I. 3) complete albino, and one female (I. 2) incomplete albino in a sibship, the size of which is not stated. I. 2 has a peculiar form of albinism having transparent but faint bluish coloured irides, nystagmus and flaxen hair, she is married and has three normal children. (Mr J. F. Streatfeild, *Lancet*, 1882, i., p. 303.)

Fig. 215. Three healthy and intelligent albinos in a childship of eight. IV. 4, aged 22, albino with nystagmus, a porter, born at 7½ months, was not expected to live and had fits. IV. 5, aged 21, albino born at full time; IV. 6, aged 18 (1906), albino with nystagmus, and H. As. 4 D. horizontal, V. $\frac{6}{36}$; born at full time; no fits; teeth show great defect of enamel; IV. 8, aged 16, dark hair, good sight; IV. 11, aged 12, blue eyes, rather fair brown hair, no nystagmus, refraction H. about 2 D., V. (under atropine) $\frac{6}{12}$, fundus normal. IV. 7, 9 and 10 miscarriages. Mother (III. 3) brown hair, blue eyes, aged 57 (1906); married twice, by first husband (III. 4) three children (IV. 1, 2, 3) all with blue eyes but not fair hair; 3 of their children (V. 1 to 4) not fair. Intervals of from one to two years between the successive children IV. 1 to 11. Age of III. 3 at first marriage about 26; interval between first and second husbands about five years; age at second marriage 35; health good throughout. Complexion of others: fair but not like the albinos, II. 4 and 6, V. 3, III. 6, 11, IV. 1, 2, and 12, 13, 15. Dark I. 1 and 2, II. 1 and 2, and all 3 to 15 except 4 and 6. Many descendants of III. 1 and 2 not shown, none specially fair. V. 1 had double hare-lip and died at six months. (Mr Wherry, Case 3.)

Fig. 216. By an error this pedigree, abstracted from *Deaf Mutism*, 1896, by J. Kerr Love and W. H. Addison, was attributed by the abstractor to Mygind. It is actually given by Holger Mygind, *Deaf Mutism*, London, 1894, p. 76, but is there cited from Ludwig Dahl's work on insanity in Norway, whence it had already been abstracted and engraved as Fig. 319 on Plate XXX.

PLATE XXV. Fig. 217. One albino in a sibship of four, the parents being first cousins. No details. (Dr S. M. Bemiss, "Report on Influence of Marriages of Consanguinity upon Offspring," *Trans. American Med. Assoc.*, Vol. III., pp. 319—423: see p. 405, 1858: see also Figs. 250—255.)

Fig. 218. Two albinos in a sibship of eight. II. 4 died, aged 4. Origin of family, Berkshire. (Dr E. Stainer.)

Fig. 219. Two albinos in a sibship of nine. II. 3 says of himself, "Every hair I have is perfectly white, and eyes blue. When young my eyes were weak, but are now stronger, still I am near sighted." With the exception of the two albinos, all the siblings are dark. I. 1, father is dark; I. 2, the mother had fair hair as a child but dark eyebrows and lashes; when grown up her hair turned quite dark. (Dr E. Stainer.)

Fig. 220. Three albinos in a sibship of six. II. 2, aged 29; II. 3, aged 26; II. 5, died at one month old. (Dr E. Stainer.)

Fig. 221. Two albinos in a sibship of seven. Both parents very dark. No family history of albinism known. Origin of family, Oxfordshire. (Dr E. Stainer.)

Fig. 222. Two albinos in a sibship of five with a good many unusually fair kin (who would probably have been marked with half-black circles by some collaborators) and tuberculosis in the stock. III. 2 and her sister III. 4 are complete albinos, white hair, pale blue irides, reddish pupils, nystagmus, sight poor, ages 36 and 29 respectively. III. 3, who suffered from phthisis, was very dark, her husband (III. 1) was

also very dark, her three daughters, now aged 14, 12, 10, had blue eyes, were very fair, but had good sight. The mother died in childhood at 24. The albino (III. 4) is also phthisical and her husband likewise, he has dark hair and blue eyes. Their five children are unusually fair. IV. 4 died at eight weeks of pneumonia, IV. 5 brown eyes, aged eight, IV. 6 died at $4\frac{1}{2}$ of meningitis, blue eyes; IV. 7, aged three, gray eyes; IV. 8, aged $1\frac{3}{4}$, blue eyes; III. 5, aged 27, has fair hair, blue eyes and good sight; III. 6, aged 22, dark hair and "black" eyes. The mother and father (II. 11 and II. 4) of the albinotic sibship have dark hair and eyes, healthy, of good sight and living, aged 54 and 52 respectively. Of the four grandparents I. 1 is living at 90, dark hair and eyes; I. 2, dark eyes and medium hair, died of a "stroke" at 50; I. 3 was very dark and died from accident at 45; I. 4 was said to be "not fair" and died of pneumonia at 53. There was no kinship between the parents or four grandparents. Of the father's sibship, all were dark, II. 1 died of Bright's disease between 40 and 50, II. 3 by an accident at 38, II. 6 at 18 of "galloping consumption," there was also a brother who died as an infant, *not entered on figure*. The two sisters II. 2 and II. 5 are alive, dark, and 5 has suffered from erysipelas and poor sight, aged 56 and 51 respectively. Of the mother's sibship: II. 7 died of diphtheria at 52, fair, eyes blue, good sight; II. 8 died at 47 of "stroke"; II. 9 alive at 42; II. 10 and II. 13 died in infancy; II. 12 is married; the whole of this sibship except II. 7 are dark like the albinos' mother. There are 25 cousins of the albinos not recorded in figure, almost all dark. (Dr Amy Robinson.)

Fig. 223. Two albino cousins IV. 2 and 5, one of whom has a partially albinotic son VI. 1. They are great-grandchildren of an albino woman I. 2. Cornaz who describes the case says that:

"Chez toutes deux les cheveux ont, à la fin de l'été, une teinte d'un blond-clair, tandis que les cils et les sourcils sont blancs, couleur dont se rapproche celle de la chevelure pendant l'hiver: toutes deux travaillent au grand soleil et présentaient des bras colorés de rose, couleur qui se retrouvait sur les joues et au nez, tandis que les parties moins exposées à l'air étaient pâles: les iris paraissent d'un gris extrêmement clair quand on les regardait à l'ombre, tandis qu'au grand jour ils présentaient un mélange de rose et de grisâtre, et que la pupille paraissent rouge: les paupières se rapprochaient dès que ces personnes regardaient du côté du soleil, phénomène, qui se produisait aussi, quand elles voulaient lui, ce qui avait lieu à une distance de cinq pouces environ; oscillations continuelles des globes oculaires." (C. p. 376.)

When younger they suffered much in broad daylight, but had grown more used to it, the skin was then also whiter than at present. IV. 2 had no tendency to scrofula; catamenia had begun at $12\frac{1}{2}$. She was intelligent and recognised colour distinctions well. IV. 5 was slightly more albinotic, colour sense not tested. IV. 5 had no offspring. The husband of IV. 2 had black hair and brown irides, and the offspring V. 1. The latter is thus described by Cornaz:

"Un enfant de 2 ans qui a les yeux d'un brun-clair sans distinction dans la coloration des cercles iriens, et les cheveux d'un blond plus clair que ne le sont ceux de sa mère à la fin de l'été." (B. p. 39.)

The grandmother (I. 2) of the two brothers III. 2 and 3, the fathers of the albinos, was an albino: "sa peau était d'un blanc très-clair, ses cheveux d'un blanc éblouissant et ses yeux oscillaient continuellement." She had frequent skin troubles. III. 2 had blue eyes and his wife (III. 1) brown irides, the younger child (IV. 3) died at an early age, she had blue eyes like her father. The other brother (III. 3) had also two daughters, of whom the non-albinotic died young. As Cornaz says that the grandmother (I. 2) was from the family Gilliéron and her grandsons were also called Gilliéron, it would appear that there had probably been a consanguineous marriage in Gen. II. (E. Cornaz, Pache-Gilliéron family, Servion, Switzerland. A. *Annales de Willebroeck*, 1851, p. 34. B. *Annales d'oculistique*, T. xxiii, pp. 40—41, 1850. C. *Annales de la Société de Médecine de Gand*, T. xxxiii, pp. 375—6, 1855.)

Fig. 224. One albino (III. 3) in a fairly extensive pedigree. Hair on scalp white with tinge of yellow, moustache nearly white, eyebrows and lashes quite white; irides light blue gray; H. Astig., slight nystagmus with extreme lateral movements. Only member of family who has retained extreme fairness. His only children IV. 1 and 2 by his wife III. 7, a dark woman, are both fair with light blue eyes, but no suggestion of albinism, ages 17 and 15. *The doubt IV. 3 as to other children is to be cancelled.* Of the albino's sibship: III. 1 and 2 died in infancy; III. 4, fair as child, began to darken at 17 and is now dark, III. 5 and 6 both fair, but without suggestion of albinism, sight good. One brother is married and has a dark daughter IV. 4. There is no history of albinos on mother's (II. 1) side. The father (II. 2) was very fair as child but darkened from 20 onwards, all his siblings (II. 3, 4, 5, 6) are fair. (Dr E. Stainer.)

Fig. 225. Two brothers (I. 2 and 3) married two sisters (I. 4 and 5), all four being normal as to eyes and skin. They had five albinotic offspring. In the sibship of the first pair, we have: II. 2, aged 14 (1849) complete albino, distinguished colours perfectly. II. 3, aged 12, hair of scalp and eyelashes and brows white, iris clear blue to the light of candle, pupils black red (*noir rougeâtre*), nystagmus, oscillations less rapid than in case of II. 4; slight photophobia; skin "d'un blanc pâle, tirant un peu sur le grisâtre"; distinguishes colours well and has never had eye or skin affections. II. 4, aged ten, has hair like her sister, but the gray irides show a distinct rose reflection, pupillary circle white and pupil brilliant red; myopic, subject to ophthalmia. By the second wife (I. 1) there is a boy (II. 1) aged one year in 1849, with brown irides and normal skin. Of the two children of the younger brother, II. 5 died, aged nine, in 1848; when seen by Wartmann in that year he was in bed with advanced rickets said to have resulted from

a fall. II. 6 hair, eyebrows and eyelashes like those of her cousins, cheeks, however, rosy; eyes blue to light of candle, less nystagmus than II. 4: "Elle offre de plus un épicanthus congénial, qui recouvre la caroncule lacrymale des deux yeux, mais n'est pas assez fort pour avoir occasionné du strabisme chez cette belle enfant." All these albinos were intelligent and cheerful. Wartmann found that reading for a few minutes tired all the four living albinos. They passed their day in the air without dreading the light of the sun. No ancestral history of albinism in either parental family. I. 2, 3 and 5 distinguished colours well; I. 5 had gray irides and black hair; I. 3 had very blond hair; colour of I. 2 and 3 not stated. Dutoit-Duley family, Yverdon, Switzerland. (A. Elie Wartmann, "Deuxième Mémoire sur le Daltonisme ou la Dyschromatopsie," *Mémoires de la Soc. de Physique et d'Histoire naturelle de Genève*, T. II., p. 222, 1848; E. Cornaz, B. *Annales d'oculistique*, T. 23, p. 27, 1850. C. *Annales de Willebroeck*, 1851, pp. 33—4. D. *Annales de la Soc. de Médecine de Gand*, T. XXXIII., pp. 301—2, 1855. I have examined A, B and D, and used chiefly the first. K. P.)

Fig. 226. Five albinos in an extensive pedigree. Only one (III. 14) appears to have been examined; she is aged 18 (1907), hair nearly white, iris light blue, pupil red when light is concentrated on sclerotic, fundus of both eyes albinotic except at the macular region; refraction slight H. (1 D. only) V., $\frac{5}{6.6}$ in L., very defective with divergent squint in R.; no nystagmus; *the albinism of the retina must be incomplete*. She is the youngest of three; first (III. 12) albino aged 23; III. 13 fair; III. 12 married a woman with brown hair and has two fair children (IV. 1 and 2) and one incomplete albino (IV. 3), aged three years, with pupils red on illumination of sclerotic, but good V. and steady eyes. The two other albinos (I. 2 and II. 2) were on the father's side. Complexion of others, said to be "fair haired," I. 3, 5, II. 3, 5, 6, 8, 10, 11, 12, 14, 15, III. 1 to 5, 8, 14, IV. 1, 2, 4; "brown haired," I. 1, 4, 6, II. 4, 7, 13, III. 7, 9, 10, 11. No consanguinity anywhere. No miscarriages or stillbirths. The albinos of III. and IV. were born at full time. (Dr G. T. Schoute, Amsterdam.)

Fig. 227. Two albinos in a sibship of seven. No record of any albinism in either parental stock before III. 3 and 4, none in cousins III. 1 and 2. III. 3, aged 25, irides steel blue, purple to dark red pupils, nystagmus only in very strong light, 5 ft. 11 in., athletic (football and rowing), III. 4, aged 23.5, irides pinkish blue, pupils lighter red than III. 3, considerable nystagmus, athletic, 6 ft. 2 in., both myopic. Of other members of sibship III. 6, 7, 8 are dark, 5 and 9 (aged 12) are fair but not extremely so, hair inclined to auburn or red. I. 1 had blue eyes and brown hair, I. 2 light brown hair, eyes?; father of albinos (II. 8) hair dark (not black) and eyes gray blue; mother (II. 10), hair light brown, eyes light gray, eyesight not good, glasses for reading and needlework since 32. II. 3, 4 and two of II. 5 died as infants. No family tendency to deformity or disease. No consanguinity. Northumberland. (Karl Pearson.)

Fig. 228. A pedigree in which very marked fairness is prevalent; none have pink eyes or defective sight. Those marked black are very fair with blue or gray eyes; of these II. 2 died of phthisis at 32; III. 9, the younger of twins, died at $4\frac{1}{2}$ years and IV. 8, also the younger of twins, at 3 months. The half-black circles are less fair in various degrees. The clear circles show dark hair and brown or gray-brown eyes. (E. Nettleship.)

Fig. 229. Three albinos in two generations. V. 4, aged 6 years (1907), nearly complete albino with nystagmus, blue irides, pupils not pink, refraction My. As., fundus very light. V. 5, similarly albinotic but has no nystagmus. III. 3 said to have had white hair and blue eyes all her life, some say she was "shortsighted," others that her sight was good. Complexion of others: fair, III. 9, IV. 1 (*very*), 4, 5, 6; dark (some with blue eyes), II. 2, III. 2, 4, 5, IV. 2, 3, 7, 8. Father (IV. 5) was 21 at marriage, eyes blue, hair now brown was fair. Mother (IV. 6) was 20 at marriage, hair now brown but formerly very fair: she had 5 conceptions, V. 1 and 2 still-born at 7th month, 3 miscarriage at 5th month, then a long interval: then in 12th year after marriage V. 4 and six years later V. 5; no apparent reason for the premature births except "anaemia" (mother's statement); no evidence of syphilis. (Dr J. S. Hinnell.)

PLATE XXVI. Fig. 230. II. 1 and 5 are complete albinos, II. 2 has albinotic eyes, but red hair. Of the remaining children II. 3 is dark, and the remaining four, sex not given, have light hair and normal eyes. No consanguinity of parents noted. (Dr Folker, *Lancet*, 1879, I., p. 795.)

Fig. 231. II. 2 an albino girl who died in a blind school of epileptic fits when aged about 16. She suffered from some skin disease on the hands, so that for fear of infection, she had always to wear cotton gloves. Good complexion, white hair, pink pupils. She said that her father (I. 1) and brother (II. 1) had the same eyes and hair as herself, but II. 1 was able to go to an ordinary school. The mother, I. 2, probably Irish, and the sister, II. 3, had brown hair. Sent to the blind school by the Guardians of the Poor of Cockermouth. (Sister Maxwell, through K. Pearson.)

Fig. 232. Two albinos out of three siblings. III. 3 aged 13 (1908), complete albino, hair quite white, eyes pink, refraction Hy. Astig. R. 6 D. and 3 D., axes oblique, L. 5.5 D. horizontal, 4 D. vertical, V. not recorded; very lame from tubercular hip-disease. III. 2, aged 14, said to have quite white hair and

pink eyes, but "fair sight"; is imbecile. III. 1, aged 18, medium brown hair, blue eyes, quite well and intelligent, works in Woolwich Arsenal. Mother (II. 7), aged 42, hair nearly black, irides light brown with darker spots; has 3 D. of astigmatism. Both her parents dark or very dark, I. 4 still living aged 84, I. 3 lived to be 81. She is 3rd of three, the two others (II. 5 and 6) dark hair and eyes. Father (II. 6) aged 46, blue eyes, light brown hair, is 3rd of 12 born, only three living. II. 1 medium colour, II. 2 very dark. His mother (I. 2) was "middle coloured" and died at 72, his father (I. 1) had blue eyes and fair hair and died at 42 of phthisis. (Mr N. Bishop Harman, September 25, 1908.)

Fig. 233. Three complete albinos in a sibship of six. The albinos possessed the usual features, red pupils, nystagmus and photophobia; the ages of the sibship when seen were II. 1—6, aged 19, 17, 16, 13, 10 and 4 respectively. I. 1 had bright chestnut hair and gray eyes; I. 2 brown hair and "black" eyes, ages 54 and 44 when seen. The mother had had no unusual experiences during pregnancy.

"Ces trois enfants sont forts, robustes, bien constitués, ils ne portent aucune marque de faiblesse; leur peau est vivante, animée, ils ont l'air, la force et le coloris d'enfants blonds du même âge, et sont en cela tout le contraire de ce que les auteurs ont écrit sur la variété Albinos. Leurs cheveux sont blancs, épais, longs, roides, forts, et se rapprochent plutôt de la fermeté du crin que de la souplesse de la soie."

The recorder considers that albinism affects only the colour of hair, the coloration of iris and visual sensibility and not the whole physique. Origin of Family, Platenec near Brest. (Dr Billard, *Journal de Médecine, Chirurg. et Pharm.*, Tom. xxiv., p. 36, 1812.)

Fig. 234. In a sibship of six, five were albinos, the sixth sibling, II. 5, had dark chestnut hair, the sex of the siblings is not stated. II. 7 was born at Paris of normal French parents, when seen she was aged 23 and had four children by two husbands, the second child, III. 2, alone being an albino. She was of a delicate lymphatic constitution; no areolar pigmentation though in her fourth pregnancy; nystagmus, photophobia. The following description of the eye is given:

"L'iris est rouge au premier aspect; mais avec plus d'attention, on reconnaît qu'il est principalement constitué: (i) par des faisceaux rayonnés des fibres blanches et nacrées qui forment comme la trame de l'organe, (ii) par des lignes également rayonnées mais moins nombreuses, rouges et de longueur inégale, disposées en une sorte de réseau qui occupe les interstices des faisceaux fibreux. C'est à ces lignes que l'iris doit sa teinte rouge générale."

Later after a re-examination in consequence of a remark of Broca's, the recorder remarks:

"Je pense que les lignes rouges de l'iris ne sont pas produites par des vaisseaux mais plutôt par des parties transparentes à travers lesquelles se reflète le fond rouge de l'œil."

The mother of this albino I. 2 had a congenital white patch of hair. We have thus a noteworthy case of a partially albinotic ancestor followed by two generations of albinos. (M. Guéniot, *Bulletins de Société anatomique de Paris*, 2nd Série, T. ix., p. 261, 1864.)

Fig. 235. A complete sibship of three albinos, of which the two albino males, II. 1 and 2, were twins, both parents had dark brown hair. It is probable that the father was a nearly complete albino. "Der Mann hat von Kindheit an, wie er sich ausdrückt, an blöden Augen gelitten; seine Augenlider waren stets etwas geröthet; die Iris in jedem Auge war sehr blassblau, und mit feinem rothlichen Streifen durchzogen, so dass sie bisweilen namentlich nach starker Anstrengung etwas rosig schimmerte, auch litt dieser Mann an einem gewissen Grade von Hemeralopie." (Anonymous, *Journal für Kinderkrankheiten*, Bd. XLVII., S. 357—365, 1866.)

Fig. 236. Two brothers married two sisters, their first cousins, the elder had 5, the younger 2 albinotic children. The elder on marrying a second time non-consanguineously had several normal children. No other recorded cases of albinism in the stock. (The original of this is Brière, A., "Note sur l'Albinisme résultant de mariage entre consanguins," in the *Écho médicale Suisse*, Neuchâtel, 1859, T. III., p. 414. There may be fuller details there but this Journal has been so far inaccessible. It was quoted by Devay, *Du Danger des mariages consanguins*, 2nd Ed. 1862, p. 103. Thence it found its way into Darwin, *Variation of Animals and Plants...*, Vol. I., p. 460, and from Darwin into W. Platt Ball, *Effects of Use and Disuse*, 1890, p. 113. It may also be found, cited from Devay in Huth, A. H., *Marriage of Near Kin*, London, 1875, pp. 297—302. From one or other of these sources, it has been cited again and again as "Devay's case.")

Fig. 237. A normal woman of Milan had seven sons of whom three were albinotic. II. 1, 2, 6, 7 were normal with brown eyes and hair. During the pregnancies of II. 3, 4, 5 she is said to have drunk much milk. Buzzi attributed their albinism to a disease on her part, which made her drink much milk, and not to the influence of a maternal fancy on the children. This disease, he held, cost the children their *rete mucosum*. (Buzzi, Fr. *Dissertatione storico-anatomica*, etc., 1784, p. 81.)

Fig. 238. Albino, II. 2, second child in sibship of four; the others reported normal and healthy. I. 1 and 2 could not be traced, they were wanted by the police. The mother said on good authority to be epileptic. II. 2, aged 14 in 1904, marked albino in a blind school. Refraction in each eye -6 D. sph., -5 D. cylinder; vision with glasses only $\frac{6}{80}$; bad nystagmus; defective mentally, no memory; bad at class-work, but not so bad in general capacity for looking after himself. (Mr Bishop Harman.)

Fig. 239. An albino only offspring from the marriage of first cousins in the Department of Oise, very delicate and died early, aged 13. (Dr Ch. Aubé, *Société d'Acclimatation*, 1857.)

Fig. 240. A marriage between first cousins resulting in three offspring, the first said to be scrofulous, the second albinotic and the third a cretin. (Mantegazza, *Studi sui matrimoni consanguini*, Milan, 1868, pp. 22—24.)

Fig. 241. One complete albino in three. II. 1, aged 21 (1908), a healthy sailor from Liverpool; says he has been a patient at various times of Mr George Walker of Liverpool, and has seen another ophthalmic surgeon in a northern town. Hair snowy white, irides light blue and transmit some light; pupils not noticeably red now but are said to have been bright pink in childhood; fundus albinotic but otherwise normal; optic discs darker than surrounding fundus; nystagmus; refraction My. As., R. V. $\frac{6}{80}$, My. 5.25 D. vertical, 1.25 D. horizontal, V. corrected $\frac{6}{38}$, L. My. 5 D. vertical, 1 D. horizontal, V. corrected $\frac{6}{24}$. He is eldest of three; II. 2 living, no note of hair and eye-colour, II. 3 dead, was fair but not white. Mother (I. 2) living, said to be fair; there is a tradition in the family that there were three albino brothers in the seventh generation back from patient on maternal side. Father (I. 1) living, auburn hair; not related by blood to his wife. Stock derived from Dundee. (Mr Parsons.)

Fig. 242. One female albino infant aged $\frac{6}{12}$ third born in a sibship of three. The father dark and the mother blond, both healthy. Hair "ganz hell," the skin everywhere very delicate and entirely white. "Die Augen blitzen am Tage so wie die Augen eines Kaninchens; der Boden des Auges reflectirt die rothen Lichtstrahlen nicht nur durch die Pupillen sondern auch durch die Iris und so gar durch die Sclerotica, weil die Choridea gänzlich des Pigments beraubt ist. Die Iris ist eigentlich farblos, sie ist nur etwas weisslich am Pupillarrande." Fundus like that in Jäger's *Atlas*, Fig. 28, yellow spot red; nystagmus; turned head to light not dazzled by it¹. (J. Talko, *Monatsblätter für Augenheilkunde*, Bd. 13, S. 209, 1875.)

Fig. 243. Four albinos in a sibship of 7; the albinos as in Trail's case, Fig. 261, alternative with the normals. Both parents and all their relatives dark, no detail as to age or sex of siblings. The particular albino examined was a male aged 14. "I found him to be almost an albino with extremely fair, not quite white hair of head, eyebrows and eyelashes; exceedingly pale blue irides, but not pink; and nystagmus." V. imperfect $\frac{20}{60}$; Jaeger 5 easily; 2 D. of H. As. in the horizontal; fundus pale with partial coloboma of choroid downwards in L. (Mr W. G. Sym, *Transactions Ophthalmol. Soc. United Kingdom*, Vol. xi., p. 218, 1891.)

Fig. 244. Two albinos; II. 1 aged 24, hair, eyebrows and lashes perfectly white, nystagmus; refraction high H., about 9 D. V. corrected about $\frac{6}{80}$. II. 2, his albinotic sister, age not stated, one of twins, the other (II. 3) normal. II. 2 has slight pigment in eyebrows and eyelashes (? yellow), irides gray with patches of brown, nystagmus. II. 4 several other sibs all fair; II. 5, the last born, the only rather dark one. I. 2, mother, very fair but not to extreme degree; I. 1, father, "not very fair." Consanguinity not mentioned. [No further information can be obtained 1908 E. N.] (J. Hutchinson, *Ophthalmic Hospital Reports*, Vol. vii., p. 37, 1871.)

Fig. 245. Parents I. 1 and I. 2 both flaxen hair and pale blue eyes; two children only, the elder, II. 1, was fair like his parents and died early, the younger, II. 2, is a complete albino. At the time of record he had been recently married and had one normal child. The parents were not related, and the relations of both sides of the family who live in the same district presented no other case of albinism. Stour valley, Essex. (Karl Pearson.)

Fig. 246. Three albinos in a sibship of ten. The mother, II. 3, had dark brown hair and eyes and the father was also dark. The grandparents were normal. III. 4 was a typical albino, but had no increased vision in the dark. The author remarks on this case: "This total absence of pigment from the structure of the eye gives a most remarkable appearance to the fundus. It prevents the margins of the disc from being visible, and brings into relief as strongly the vessels of the choroid as those of the retina. Hence the appearance is that of a beautiful white ground, intersected by myriads of small vessels, the retinal arteries and veins being only distinguished by their increased size and their direction.

When looking at the part of the fundus which occupies the neighbourhood of the macula the appearance is that of a perfect blaze of scarlet, in which no outline of vessels is completely made out; and this increased area of vascularity is tolerably abruptly limited. Jäger in his *Atlas of Ophthalmoscopy* gives the drawing of the fundus of an albino which in no way corresponds to the appearance in this case. I cannot help thinking that the subject from whom it was taken was not a perfect albino."

This writer attributes the poor sight of albinos to impairment of the nervous centres owing to want of pigment, and remarks with regard to the nystagmus that the third nerve which presides over these movements takes its origin in the *locus niger* of the *crus cerebri*, normally the most deeply pigmented portion of the nervous system. (C. S. Jeaffreson, *British Medical Journal*, Vol. ii., p. 224, 1873.)

Fig. 247. Case from a village in Suabia where a grandmother, mother and son were all said to be albinos. (Bory de Saint-Vincent, *Essai zoologique sur le genre Humain*, 2nd Ed., Paris, 1827, T. ii., pp. 143—4.)

Fig. 248. Seven albinos in a sibship of 13; all but four died early, the eldest survivor being 30 and the others a few years younger in 1788. Parents both black hair and normal eyes. No further particulars. Origin Schmalwasser in Würzburg. (Pickel, Blumenbach's *Med. Bibliothek*, Bd. iii., S. 167, 1788.)

¹ The description makes the infant a complete albino *without photophobia*; it may be doubted, however, whether the sensitiveness to light would be fully developed at the age of the record.

Fig. 249. Two first cousins, "physical constitution and intelligence leaving nothing to be desired"; had two children, the elder an albino, the younger an imbecile. Origin, Commune de Creuzier, Dept. de l'Alber. (Balley, *Gazette medic. de Paris*, 1863, p. 111.)

Fig. 250. An albino, now 12 (1858), intellect normal, the offspring of an incestuous union of a well-developed brother and sister of dark hair and eyes. (Bemiss, p. 335 *loc. cit.*, Fig. 217.)

Fig. 251. Two double first cousins, healthy and of strong minds, produced nine offspring; two died young, of the survivors three were albinos, myopic, but otherwise normal and mentally bright. (Bemiss, *Ibid.* p. 351.)

Fig. 252. Three albinos in a sibship of eight, the father and mother (who has "dancing" eyes, ?nystagmus) being second cousins, grandparents and great-grandparents were also cousins. (Bemiss, *Ibid.* p. 343.)

Fig. 253. A feeble-minded woman double first cousin to her husband produced two male and four female albinos all feeble-minded. (Bemiss, *Ibid.* p. 353.)

Fig. 254. Father sandy or light hair, mother dark hair, first cousins, have two female and five male offspring of whom three were albinos. (Bemiss, *Ibid.* p. 387.)

Fig. 255. Two healthy first cousins have six offspring, all feeble and almost perfect albinos. (Bemiss, *Ibid.* p. 387.)

Figs. 217, 250—255 are American cases.

PLATE XXVII. Fig. 256. Two complete albinos (III. 12 and 13) and one incomplete (II. 4). III. 12, aged 67 (1905), hair, eyebrows and lashes white, irides blue, lenses partly opaque when first seen but not sufficiently to prevent well marked red reflex through pupils and through large parts of iris during transillumination of sclerotic; lateral nystagmus. In June 1905, right cataract being complete was extracted; the eye did well but patient died suddenly of heart failure whilst going from one room to another, 16 days after the operation. Microscopical examination of the iris and choroid of right eye showed some, but much less than normal, pigmentation of the retinal epithelium, and very scanty pigmentation of the choroid limited to the posterior part of the globe¹. Was twice married but no issue, first wife had bad health and died a year after marriage, second wife was 50 when married. He had a rupture in infancy but it was cured. Said to have been born with measles rash on him; at 36 had diphtheria following by paralysis affecting the limbs. III. 13, albino sister with moving eyes and bad sight; died unmarried at 60, cancer of liver. II. 4 had white hair like III. 12, but good sight and steady eyes; died at 68; had 5 children (III. 4 and 5) of whom nothing is known. Father (II. 2) had fair eyebrows, but hair of head not fair, sight good, died at 70. Mother (II. 7), an only child, brown hair, was operated upon for (probably tubercular) disease of knee. In III., 10 was fair and died at 65; 9, 11 and 14, dark, none fair in IV. III. 9 operated on successfully for cataract 1899, aged 68; alive in 1906; light brown hair, blue eyes; has had 9 children, all brown hair and mostly blue eyes, 8 are living and 6 of these have 23 children, none fair, 4 red hair, the rest dark. Nothing known of complexion in the rest of the pedigree. No consanguinity anywhere. Nothing known about health of albinos' mother (II. 7) nor whether albinos were born at full time or not. (C. H. Usher.)

Fig. 257. Three albinos in a sibship of seven. IV. 9, aged 30, unmarried, a professional man; hair nearly white, ends yellow, brows and lashes white, irides blue, no note as to redness of pupils, rapid lateral nystagmus (120 per min.); refraction H. (degree not noted), V. $\frac{6}{80}$; fundi albinotic; strong, medium height and weight. IV. 7, aged 33, single, fair skin, yellow hair; an albino. IV. 11, aged 27, single, albino. Their sibs, IV. 8, aged 31, brown hair, pale blue eyes, married, no issue; 10, aged 28, auburn hair; 12, aged 24, dark hair and eyes; 13 died in infancy, had very fair hair and blue eyes. "The three albinos have the best constitutions in the family." Complexions of others: fair, II. 12^a (hair originally white or nearly so, and brows and lashes remained white though hair of scalp turned brown, eyes violet), III. 6, 11, one of III. 9, IV. 15, 16, 17; blue eyes but dark hair, II. 12, III. 7, 12; dark or not fair, all I. and II. except II. 12^a, III. 1 to 8, 11. Father (III. 7) medium hair, dark blue eyes. Mother (III. 12) dark hair, brown eyes. No consanguinity. Mother's health good whilst child-bearing. None of the albinos born prematurely. (C. H. Usher.)

Fig. 258. Six albinos in two nearly related sibships of a large pedigree. III. 16, aged 44, single, tall, well-built, innkeeper; hair, brows and lashes quite white; skin does not blister easily; irides gray with slight blue tinge, translucent; pupils red; lateral nystagmus 124 per min.; fundus albinotic but choroidal vessels not conspicuous at yellow-spot region; refraction H. As., H. 2 D. vertical, 4 D. horizontal in L., 5 D. in R., V. corrected $\frac{6}{38}$ L., $\frac{6}{30}$ R. III. 14, aged 48, single, hair quite white, eyes "gray and moving," very shortsighted, good health. III. 17, aged 42, single, formerly a schoolmaster, is musical, has lately been for a time in a lunatic asylum; no insanity known in any other member of the pedigree. Father (II. 3), light brown hair, brown eyes, lived to 70, good sight, married at 47 and first child born

¹ A fuller account, with coloured Plate of sections of the Choroid, was published in *Trans. Ophthalmological Society of United Kingdom*, xxvi. 248 (1906). See our Plate a, and the Chapter on the Albinotic Eye.

when he was 50. Mother (II. 7), hair and eyes brown, lived to 81, married at 30 and first child born when she was 33. Of the albinos' two sibs III. 13, aged 50, has dark hair and brown eyes, single; III. 15, aged 46, auburn hair, brown eyes, is the mother of the second batch of albinos; her husband (III. 26), aged 46, hair nearly black, eyes dark, healthy. They have six children (IV. 13 to 18) of whom the 3rd, 4th, and 5th (15, 16, 17) are albinos with white hair, blue moving eyes and short sight; the other three IV. 13, aged 17, IV. 14 and 18 all have brown or dark hair and brown eyes. Colour of hair and eyes in others: fair with blue eyes III. 24, 25, IV. 25, 26; dark with blue eyes II. 8, III. 35; dark or brown hair, brown eyes, nearly all the rest; doubtful, a few in IV. (C. H. Usher.)

Fig. 259. A sibship of five with three complete albinos. The twins are dead, the remainder alive. The parents were second cousins. No trace of albinism in any other member of the family known to my informant, but the parents are very reticent on the subject. Origin of family, Lancashire. (Karl Pearson.)

Fig. 260. A sibship of seven, with six albinotic and only one normal. Probably from neighbourhood of Leipzig. (Lesser in Ziemssen, *Handbook of Diseases of Skin*, Eng. Trans. 1885, p. 446.)

Fig. 261. A sibship of six with three male albinos, one being twin with a normal. The father, I. 1, had dark blue eyes and black hair; the mother, I. 2, blue eyes and light brown hair; the mother stated that one of her cousins was an albino. II. 1, aged 9, blue eyes and brown hair, not deficient in intelligence; II. 2, red eyes, flaxen hair and very fair skin. The normal twin, II. 3, had blue eyes and dark brown hair; the albino twin, II. 4, died at nine months; II. 5 had blue eyes and brown hair; and II. 6 at time of record was an albino baby of nine months old. Origin of family, Anglesea. (Dr T. S. Trail, *Nicholson's Journal of Natural Philosophy, Chemistry and the Arts*, Vol. xix., p. 81, 1808.)

Fig. 262. Three albinos in a sibship of five. No further information, except that they were natives of Essex. The same author mentions a family in which there was a male and a female albino child, but does not give details of other siblings. (Dr Nicholson, in a note to Trail's paper, see Fig. 261.)

Fig. 263. I. 1 with brown hair and I. 2 with chestnut hair had an albino son. I. 2 had an albino sister. No further details. French. (Trélat, *Dictionnaire encycl. des Sciences médicales*, T. III., p. 413.)

Fig. 264. In a sibship of nine, three, the second, third and fourth born, were albinotic, weaksighted and suffered from nystagmus. The first, fifth and sixth were dark haired and died in early childhood; the seventh, eighth and ninth were dark haired and healthy. *By a slip the parents were made first, and not second cousins on the plate.* (Dr Laqueur, *Zeitschrift für Augenheilkunde*, Bd. x., p. 481, 1903.)

Fig. 265. This is the classical case of Dr G. T. L. Sachs and his sister as described by himself. The father, I. 1, was strong, black hair and brown eyes. The mother, I. 2, had like eye and hair colours; she reached puberty late in life, married late and had difficult confinements. The siblings II. 2, 3, 4 were like the parents, of markedly brunette type. It is recorded that the mother when 29 weeks pregnant with II. 1 had light reflected into her eye from that of a hare, which caused her great alarm. Also when three months gone with the second albino, II. 5, she was frightened by another hare without seeing, however, the light. This labour was also difficult, but not equal to that in the case of II. 1. Sachs was not able to find in his sister or himself the *lanugo*, then attributed to albinos, but only such rare hairs as occur on the bodies of normal individuals. Sachs (*loc. cit. infra*, § 21) himself had experienced the oft cited scaling (*desquamatio*) of the skin at parts. The general colour of the iris was blue, more or less red here and there, near the margin especially. The iris presented a series of concentric circles of white lines and intersecting radii (p. 37), nystagmus, photophobia and red pupils as usual. Sachs describes the visual powers of his eyes very completely for the date of his work. He found colour sense good. He possessed, however, "hyperchromatopsy," or the faculty (? defect) of associating colours with numbers, letters, days of the week etc., in series (pp. 80—84). This faculty is not, however, characteristic in any way of albinos, as we have not come across another case of it, and it is well known to occur not so infrequently in normal individuals¹. Sachs was a man of very considerable intellectual power. He was 25 at the time of the publication of his monograph, and he died in 1814 of typhoid. In Meckel's *Deutsches Archiv für Physiologie*, Bd. 1., Heft 1., §§ 188—201, 1815 will be found, "Eine physiologisch-optische Beobachtung von dem im Jahr 1814 verstorbenen...J. T. (*sic*) Sachs." There is a note added by D. Harles speaking highly of Sachs' powers. (G. T. L. Sachs, *Historia nat. duorum Leucaethiopum...*, 1812.)

PLATE XXVIII. NEGROES.² Fig. 266. I. 1 and I. 2 full dark negroes. II. 1—5 the siblings all dark coloured, some of them black. II. 6, the only albino in the sibship, had perfectly white hair when young, now light yellowish brown; eyes clear brown, dark pupils, nystagmus, photophobia; negroid features, florid complexion. "Contraction of muscles of face consequent upon the action of light has given a permanent expression and caste to the features. When examining an object in a bright light, the eyes are nearly closed, and they are placed very near and moved from side to side in a restless manner." (Dr Joseph Jones, *Trans. American Medical Assoc.*, 1869, p. 41.)

¹ Francis Galton, *Inquiries into Human Faculty*, 1883, pp. 145—154.

² A number of further negro cases will be found on later plates.

Fig. 267. "An example of complete albinism in the negro, *alphosis aethiopica*, *leucaethiopes*, might have been seen frequently in the streets of London a few years back; the subject was a tall sickly looking man who styled himself Henry Alexander Commotius Stewart, the African albino. This man was born in New Providence of black parents, his father being a negro from Guinea, and his mother a native of the isle of Antigua, descended from African slaves. His four brothers and sisters were all black. He is tall, has a complexion like that of a dead leaf, sprinkled over with large and irregular freckles, light coloured eyes, and light red woolly hair, surmounting features obviously bearing the African stamp." (Erasmus Wilson, *Diseases of the Skin*, 6th Ed., 1867, p. 701.)

Fig. 268. Negro parents with an albino female child, II. 1, with white hair, blue eyes, nystagmus, etc., well-developed physique and good constitution. No statement as to whether there were other siblings. (Given without reference as due to Alibert in the *Journal für Kinderkrankheiten*, Vol. XLVII., pp. 357—365, 1866.)

Fig. 269. "A man worthy of credit saw at Cartagena in America a negro and negress whose children were white, like those we have just described, with the exception of one which was white and black, or pied, they belonged to the Jesuits, who designed them for the Queen of Spain." (Diderot and D'Alembert, *Encyclopédie*, T. II., Article "Nègre," p. 79.)

Fig. 270. Two brothers, aged 25 and 20, born of negro parents almost black, seen by de Porte at Maraca in the province of Bahia, Brazil. No statement as to siblings. The skin was white but spotted with freckles, the hair white and frizzly, the eyes red and photophobic. (P. G. Mahoudeau, *Revue Mensuelle d'Anthropologie*, 1895, pp. 325—342.)

Fig. 271. Mr Buller's female negro albino slave; she had at the time of record, one black daughter by a black negro. Jefferson says she was strong, but he had no knowledge of her sight. (Thomas Jefferson, *Notes on the State of Virginia*, London, 1787, pp. 118—120, Case (iii).)

Fig. 272. III. 4 is an albino boy aged 11—12 years. He is the illegitimate son of a red to brown father, II. 3, and a dark brown negress, II. 4. She has four other children, III. 4 by another man, II. 5, and these are all dark brown. Her mother, I. 4, father, I. 3, brothers and sisters, II. 6, were all dark like herself and she never heard of any other albinos in her family. The father, II. 3, had a father, I. 1, of peculiar colouring; he has been described as having an "ugly" head, reddish hair and gray eyes, and a brown skin; the mother of II. 3 was black; his sister, II. 1, is the brown type of negress. If there be anomalies of colour in the family of II. 3 no complete case of albinism is known. There is a possibility of some white blood long back. II. 3 is a married man and among several dark children III. 1 has had two "fair" (so described by negro informants) daughters, III. 2 and 3, one of these is now dead, the other (seen by Dr Heath) had a quite dark brown skin, hazel eyes and hair like rusty iron. (Dr W. G. Heath, Montserrat, B. W. Indies.)

Fig. 273. Two completely albinotic children of W. Indian very dark negro parents, II., 1 seen at about 6 months old with beautifully white complexion, reddish white woolly hair, blue eyes and marked nystagmus; seemed to see well. (Dr W. F. Cleaver, Trinidad, April, 1907.)

Fig. 274. "At Waukapang, I saw a young man about 18 years of age, tall and well-formed, whose father had been a white negro. This young man's mother, three brothers and two of his sisters were black, but one sister was white like himself. His skin from exposure to the sun had acquired a slight reddish tinge, and was covered with a great number of black or brown spots, like freckles, some of which were nearly as large as a sixpence. It was much rougher and harsher to the touch than the woman's, feeling almost like the skin of a lizard. He complained very much of the action of the sun, which cracked his skin, and sometimes occasioned it to bleed. He was also peculiarly sensible to the bites of insects; the iris of the eye was a reddish brown colour, and his sight very weak." (Thomas Winterbottom, M.D., *Account of the native Africans in the neighbourhood of Sierra Leone...*, London, 1803: see Vol. II., pp. 166—174.)

Fig. 275. Four albinos in a sibship of ten. The father and mother belong to the tribe of Beugas, composed mostly of fishermen living round Cape Esteiras, which is the extreme south of Bay of Corisco and is not far from Point Clara, on the north of the estuary of the Gaboon. Not the least sign of albinism in parents, skin uniformly black. (Anthropometric characters given in original.) The mother has borne one albino and then two normal children alternately; II. 2—3, the twins, the elder of II. 5, and the elder of II. 7 are dead. All the albinos are alive, saved from death by missionary influence as the population regard the birth of an albino as "une vengeance du ciel, et le voient impitoyablement à la mort." The eldest albino, II. 1, aged 16, suffers from photophobia and rotatory nystagmus; obliged to impress on the "globes oculaires des mouvements partiels de rotation, afin de trouver un axe visuel plus favorable." These albinos were affected also by a constant running of the eyes and a perpetual winking of the eyelids; there was little or no pigment in the irides, which were of a blue rose colour; the pupils of ruby red. The hair of scalp short, woolly and of the colour of sulphur; eyebrows and lashes little marked and of same colour. The skin was of a rose colour, "mais au lieu d'être lisse et unie comme chez les Européens elle est rugueuse et fendillée dans toutes les régions du corps—très facile

à s'excorier, et présenté même dans quelques parties des squames analogues à celles du psoriasis, ou encore à celle de l'ichthyose, particulièrement de la variété dite nacrée."

This evidence in favour of the scales is important as coming from a competent modern observer. The albinos were of good intelligence. (Dr Louis Vincent¹, *Bulletin de la Soc. d'Anthropologie*, 1872.)

Fig. 276. II. 1 and II. 2 are male twins born as albino natives in Madagascar. There was no family history of European crossing.

"Système pileux:—partout très fourni—d'un blond pâle—chevelure serrée, crépue. Iris: de coloration bleu verdâtre, très pâle tirant au brun sur le pourtour de la pupille, celle-ci bien noire."

Sight excellent, but appeared to suffer in an intense light. Skin absolutely white, rosy on face and neck, comparable with that of northern races. (Such cases are said by Corre not to be very rare in Madagascar and the adjacent islands.) Topinard holds the cases not to be completely albinotic, because the pupils were black not red, and the vision was good, no mention of nystagmus. (Communicated by Corre to P. Topinard, *Association Française pour l'Avancement des Sci. Compte rendu*, 1879, p. 850.)

Fig. 277. Two female, II. 2 and 3, and one male albino, II. 5, in a sibship of six, in which the other three siblings possess all the peculiarities of negroes. The albinos outlived the black offspring. Father and mother, good specimens of African race. Mother accounted for appearance of first albino by a severe fright received from the falling down of an old white mare she was driving. She suffered much mortification at appearance of her white offspring and endeavoured to make it dark by exposing it to rays of sun, etc. The albinos have all the features of regular built negro children, "flat foot and broad leg inserted in centre of same with a natural curve of tibia." Thick lips, broad nose, hair woolly and curly resembling combed worsted in colour or a white spaniel, eyebrows and lashes the same; skin unusually delicate and fair; eyes light blue, "cornea surrounded by a delicate ring of pink or peach blossom, the pupil encircled with the same coloured ring, giving to the eye a peculiar appearance." These albinos were intelligent and active, placed however the hand above the eyes for shade in a strong light, from which their sight suffered. (Dr Samuel L. Marcy, *American Journal of Medical Sciences*, Vol. xxiv., p. 517, 1839.)

Fig. 278. This is a very famous negro albino case. Genevière, II. 3, was born in Dominica in 1759 of black parents from Gold Coast. She was brought to Paris, and in 1777 the Abbé Dicquemare, Buffon, and others saw and described her. Unfortunately Dicquemare and Buffon are not wholly in agreement, but the latter saw her again four years later (1781) and confirmed some of his statements. Stature 4 ft. 11 inches, whole appearance except pigment negroid. Skin, "blanc fade," (D.) "blanc mat, blafard et inanimé" (B.), but on cheeks, etc., a slight tint of red, which increases "dans les momens de vivacité et de timidité" (Dicquemare), or according to Buffon when she neared the fire or was ashamed of being examined. Little patches of violet (D.), but red (B.) on face (? freckles); skin not soft like that of other negroes (D.). Typical negro smell present according to D., absent according to B. Very little hair or down on any part of body; scalp hair 1½ inches long, white at roots, naturally curly and reddish at terminals (B.). D. does not notice this red. He says that the hairs are "blonds et les sourcils comme les cils d'un blond un peu plus doré." Sight, poor without being myopic (D.); short-sighted, but sees clearly (B.)—photophobic (D.), eyelids half closed (B.), nystagmus, "eyes move from temples towards nose downwards" (B.), "continuous involuntary motion and not always together" (D.); she could not see better or worse than others at night (B.). Iris, gray with a little tint of orange towards crystalline lens (D.); composite, interior around pupil is a "cercle jaune indéterminé," then a circle "mêle de jaune et de bleu," and lastly a circle of "bleu foncé" which forms the circumference of the pupil; seen at a distance the eyes appear "bleu sombre" (B.). (Possibly the "jaune" of both writers was not the yellowish pigment which in slight quantities causes some dark race albinos to have greenish or yellowish green irides and in whom also there may be enough choroidal pigment to prevent pupil being red; but a partial transmission of red of choroid through the thinnest (peripheral) part of iris. The fairly large number of dark-race albinos with not very marked redness in pupil or iris, suggests the importance of a full dissection of such an eye especially with regard to any racial difference in tissue structure). Buffon says that all her siblings were black, but Dicquemare confirming the point that there were some negro children reports that "un aîné, né blanc, a noirci peu à peu en grandissant; cet Ethiops toujours croissant s'est enfin arrêté à la couleur des Cabres" (offspring of black and mulatto). This is further evidence of the prevalency of pigmentation irregularity in albinotic stocks. He was married and had black children. (L'Abbé Dicquemare, *Observations sur la Physique*, T. ix., 1777, pp. 357—60, T. xxxvii., p. 303; Buffon, *Histoire naturelle*, Supplément, T. iv., Paris 1777, pp. 564—5.)

Fig. 279. A negro, II. 5, whose father, I. 1, was an albino married twice, the first wife, II. 6, had five normal children and one albino child, the second wife, II. 7, had six normal children and three albinos. Two brothers of II. 5, both married, had only normal children. No details of order of birth, sex, or extent and nature of albinism nor of colour of negro parents provided. Nothing as to ancestry of the negro wives could be ascertained; probably had the marriages been consanguineous, it would have been noted.

¹ Dr Vincent had seen cases of partial albinism among the Gaboonais, Pahouins, Boulons and Kroomens, but in these cases only part of the skin was without colour and he considers that they ought to be ranked with the pied negroes.

(Dr W. C. Farabee, *Science*, N. S., Vol. 17, p. 75, 1903; a note follows by Prof. W. E. Castle on the Mendelian character of the results reached, based upon the assumption that II. 5 married in succession two wives in both of whom albinism was recessive. "The probability of such unions is indicated by Mr Farabee's observations of other albinos in the vicinity.")

Fig. 280. Albino negress, II. 1, about 30 years of age or more, white blistered looking skin, with large brown freckly spots on the exposed parts, some of them warty; the hair is reddish, almost white; eyes intensely photophobic; ulceration of face, at first of typically syphilitic appearance, now probably malignant and has destroyed one eye. Father, I. 2, alive, black man; mother, I. 1, dead, also black or brown. The albino's siblings II. 2 and 3 consist of a brother and sister both dark. Her father, I. 1, has children, II. 4, by a second wife, I. 3, all black. Nothing known of I. 2's family history, and no other albinos known in family. The woman herself (II. 1) has three illegitimate sons alive, and one son dead, all dark. (Dr W. G. Heath, Montserrat, B. W. Indies.)

Fig. 281. Two negro brothers, I. 2 and 3, married negresses. The one, I. 2, had two albinotic negro grandsons, III. 1 and 2, and the other, I. 3, had twice twins, one twin in each case being an albino. No further details. (Cited by Dr Crocker, *Diseases of the Skin*, Vol. 1., pp. 621—6 as reported by A. P. Boon at the Medical Meeting, Leeward Islands, 1892.)

Fig. 282. This is a case due to Brûe, but it appears under diverse forms in many 18th century writings, so that it is difficult to be quite sure that one is not repeating the case under other authors' names. Père Jean Baptiste Labat in his *Nouvelle Relation de l'Afrique occidentale*, 1728, compiled from memoirs of André Brûe, is probably the earliest and best authority. He writes T. 5, p. 140, that M. Brûe saw at Bissaux a thing too singular, not to find a place in his narrative: a woman born in the same island of black father and mother, who was as white as an English or Dutch woman. She was married to a black, and had children blacker than moles. M. Brûe made all necessary inquiries to be certain of the truth and was surprised to see the children quite black "since according to the rule, they should have been 'bazanez' or mulattoes, since they were offspring of a white and a black." Bissau, or Bissau is, presumably, near Bissagos just south of Cape Verde. Brûe's case is cited by Jean B. L. Durand, *Voyage au Sénégal*, Paris, 1802, T. 1., p. 122; L'Abbé Demanet, *Nouvelle Histoire de l'Afrique française*, T. II., p. 67, 1767. Demanet speaks as if many albinos were to be found on Inau Island, near Bissau—"men to whom daylight is insupportable, their eyes are too weak, and only open in the darkness of the night. They are in the race of men what owls and bats are among birds." Vol. II., p. 208. See also *A New General Collection of Voyages and Travels*, London, 1746, Vol. 2, p. 97, and often elsewhere.

Fig. 283. Two negro parents had five daughters, three of whom were albinos (Colonel Skepwith's albino negresses). II. 3 died in childbed; she had married a normal negro and had two normal black children by him; II. 4 was also married to a black and had black issue, number not stated; the third albino sister was killed by lightning at 12 years. "Their eyes are in a perpetual tremulous vibration, very weak and much affected by sun, but they see better in the night than we do." Speaking of negro-albinos in general Jefferson writes: "I have known four of these myself, and have faithful accounts of three others. The circumstances in which all agree are these. They are of a pallid cadaverous white, untinged with red, without any coloured spots or seams; their hair of the same kind of white, short, coarse and curled as that of the negro; all of them well formed, strong, healthy, perfect in their senses, except that of sight, and born of parents who had no mixture of white blood." Farabee (Fig. 279) found his negro albinos taller than ordinary negroes. (Thomas Jefferson, *Notes on the State of Virginia*, London, 1787, pp. 118—120, Case (i).)

Fig. 284. II. 2, Colonel Carter's negress, daughter of black parents with three black siblings. She had an albino child by a black negro, which died a few weeks old. She is freckled and her eyesight so weak, that she is obliged to wear a bonnet in the summer, but the sight "is better in the night than the day." (*Ibid.*, Case (ii).)

Fig. 285^a. Five albinos in a negro sibship of 13 on the banks of the Hudson. Coloured progenitors, I. 1 and 2, still living (1884), aged 60 and 70. The albinos are said to be complete and the eight negro siblings pure representatives of African type. The first birth was black, then white and black births regularly alternated as far as the tenth, after which all were black. Skin in this case fine and delicate, ability good—practical sense and quite correct use of language and musical power in both white and black members which amounts almost to genius. Only three of thirteen now living, one coloured, the mother of a large normal family, and two albinos, the one II. 3 is now a widow and had two normal children by a normal negro husband; the other married only four months. These three survivors appear healthy and strong, the other ten were, whether black or white, delicate and "faded young." The two albinos were very afraid of sunlight as children, but now far less sensitive. (J. S. H., *The Popular Science Monthly*, N.Y., Vol. 25, 1884, p. 122.)

Fig. 285^b. Twins, aged 18 to 20 years, one black and the other albino, born of negro parents. "Peau blanche sans tache, cheveux très crépus et blancs tirant sur le roux, yeux grands, de couleur d'un bleu clair, sensibles à la grande lumière." Town of Bahia. (M. Porte: *Revue d'Anthropologie*, T. 1., pp. 160—1, 1872.)

Fig. 285°. Two albino sisters, aged 10 and 12 to 14. "Peau blanche avec de très légères taches (?freckles), yeux rougeâtres et presque fermés à la grande lumière, cheveux blancs tirant vers le roux et très-crêpus." Father and mother negroes, no statement as to other siblings. Locus Breves, interior of Para between capital and mouth of Amazon. (*Idem.*)

Fig. 286. I. 2 a dark normal negro married a negro with white spots on arms and legs which increased with age, and which might clearly be attributed to leucoderma. Of their offspring 4 boys (II. 1) had no spots and six daughters (II. 2) had white spots. The seventh daughter, II. 4, first developed white spots, or they were first noticed when she was 40 years old, and at that time were mistaken for leprosy. She married twice; first II. 3 a stout large negro without spots, and had three children who died in infancy, no spots being observed; the fourth child, III. 2, a daughter, had a few white spots on arms and thighs, she married a typical (normal) negro and had two completely albinotic children, IV. 1 and 2; the former died aged 14 months and the second was alive at 18 months. By her second husband, II. 5, the spotted negress, II. 4, had a son, III. 5, with white spots (other children?) who married a normal negress and had a light brown (?mulatto coloured) offspring. The negress, II. 4, is thus described: "The anterior surface of her face, arms and thighs presents a mottled appearance, with whitish and dark brown spots upon the dark brownish yellow skin, 24 perfectly white spots of irregular shape and size, the largest being about $\frac{4}{10}$ " in diameter were counted upon the anterior surface of the arm, between the elbow joint and the wrist."

The following description leaves no doubt that IV. 2 was a complete albino: Skin over the entire surface perfectly white, rivalling in whiteness that of the fairest and most delicate white child of the same age. Iris very pale, bordering on pink with light bluish and purplish reflections; pupils bright pink; nystagmus, photophobia; features thoroughly negro; feet present usual character of African race. Hair crisp and curled, perfectly white and similar in all respects, with the exception of colour, to the crisp, curling wool-like hair of the father and mother.

This case is a most important one; if we attribute the white spotting, which was not wholly congenital to leucoderma, we have further evidence that leucoderma is inherited; that it can lead to albinism in the fourth generation suggests that progressive leucosis and stationary and complete albinism are not wholly unrelated in character. (Dr Joseph Jones, *Trans. American Med. Assoc.*, 1869, p. 41.)

Fig. 287. Two black slaves in Virginia married and produced a white girl. "When the poor woman was told the child was like the child of white people, she was in great dread of her husband, declaring at the same time that she had never had anything to do with a white man in her life, and therefore begged they would keep the place dark that he might not see it. When he came to ask how she did, he wanted to see the child and wondered why the room was shut up as it was not usual. The woman's fears increased when he had it brought into the light; but while he looked at it he seemed highly pleased, returned the child and behaved with extraordinary tenderness. She imagined he dissembled his resentment till she should be able to go about and that then he would leave her; but in a few days he said to her: 'You are afraid of me and keep the room dark because my child is white; but I love it the better for that; for my father was a white man, though my grandfather and grandmother were both as black as you and myself; and although we come from the place where no white people were ever seen, yet there was always a white child in every family that belonged to us.' The woman did well and the child was shown about as a curiosity; and was, about the age of 15, sold to Admiral Ward, and brought to London in order to be shewn to the Royal Society." (Dr Parsons, *Phil. Trans.*, Vol. 55, 17—65, p. 45.)

Fig. 288. A remarkable case, which according to Dr Philippe Fermin occurred in the Plantation of Vossembourg in Surinam in the first half of the 18th century. The father and mother were Creoles (at that date this meant negroes born in the colony) and "très noirs." They had 8 children; II. 1 was a mulatto, II. 2 a normal black, II. 3 an albino negress, II. 4 a mulatto, II. 5, Jean Witt, an albino negro, II. 6, three normal blacks. Of the so-called mulattoes, we have no further account; they can only be taken as suggesting (what we find in other negro pedigrees, see Figs. 272 and 286) that abnormally light negroes occur in albinotic stocks. II. 3 became historic, she was taken to Paris in 1734, and we have descriptions of her by Treytorens, a doctor of Surinam in 1734, by Voltaire who saw her in 1744, and by de Maupertuis in the same year. It was this "small white animal" of Voltaire and "little monster" of de Maupertuis that set Europe searching for albinos. Treytorens gives the most reasonable account, seeing her 9 or 10 months after birth. Her mother, I. 2, was a well-made, large slave negress. II. 3 was well formed with negro features, especially nose and lips. Skin very white; wool as white as snow on head; photophobia and nystagmus; "son iris étoit d'un rouge fort vif et couleur de feu, marbrée seulement de quelques traits blancs tirants sur le bleu; la prunelle que nous ne connoissons que noire, et qui doit l'être puisque c'est un vuide, étoit aussi très rouge." (B. pp. 15—16.)

Voltaire who saw her 10 years later adds little of value; he notes the crablike motion of the eyes (C. p. 326). Maupertuis who saw her in the same year (but said she was 4 or 5 years old!) observes that the white wool on the head was "tirant sur le roux" and calls the eyes "bleu clair" and the hands like paws. He not unnaturally philosophises on the subject, considers it a hereditary disease of the *membrane réticulaire*, and develops a theory of inheritance to explain both inheritance and reversions, which is at

almost all points identical with Darwin's theory of pangenesis (D. pp. 115—123). The differences between Voltaire's and Maupertuis' descriptions of the eyes (which have led a later writer¹ to describe Voltaire "aussi mauvais naturaliste que bon poète") are no more than might easily arise from the endless changeability of the albinotic eye as seen in different lights by the lay observer.

II. 5 was born May 12, 1738, four years after his albinotic sister. He was closely examined by Fermin in 1760; true negro type, 5 ft. 4 in., flat nose, coarse lips, two first teeth of the upper jaw much larger and longer than the others. Hair of all parts of body, profuse, very white and like the fine hair of a she-goat. He had never had commerce with any negress on account of his colour, so that he was without offspring, and probably would remain so. "C'étoit une espèce d'idiot, ... il étoit cependant en tout très bien conformé." Lastly with regard to his eyes: "La structure du globe n'avoit rien de particulier; mais la conjonctive étoit parsemée de petits filaments rougeâtres; l'iris étoit d'une couleur marbrée grise et blanche, et la prunelle couleur de feu, d'une vivacité égale au plus beau diamant. La lumière qu'elle jetoit, ne paroissoit pas au grand jour; mais elle étoit parfaitement visible dans l'obscurité de la nuit." He perceived all things presented to him at any time, but only distinguished them well in the dusk. "Lorsqu'il vouloit fixer sa vue sur quelque chose, ou qu'il vouloit marcher, il tournoit toujours l'iris comme font les crabes" (A. pp. 153—4). ((A.) Philippe Fermin, *Description générale... de la Colonie de Surinam*, 1769; (B.) Castillon citing Treytorens, *Hist. de l'Acad. des Sciences de Paris*, 1734, pp. 15—16; (C.) Voltaire, *Mélanges d'Histoire... Œuvres complètes*, 1^e Éd. 1756, p. 326; (D.) de Maupertuis, *Vénus physique*, *Œuvres*, T. II., Chap. 4, pp. 115—123, Lyon, 1768.)

Fig. 289. A young and good-looking negress, I. 2, a slave, seen at Mascareigne (before 1825) and said to be 16 years of age, although she would have been mistaken for 30. She had been purchased in Madagascar; she was an albino "de l'espèce Éthiopique." She had two children, II. 1 and 2, one by a white man, I. 3, and one by a black man, I. 1. Both were true mongrels, having the features of their respective fathers, but "la couleur blafarde et la blancheur des cheveux" of their mother. Their eyes were weak; they were, however, not red, but "châtains très clairs." (Bory de Saint-Vincent, *Essai zoologique sur le genre humain*, 1827, p. 145.)

Fig. 290. Two "plus noirs" negro parents at Paramaribo had an albino son, aged about 30 when seen in 1760. "La peau blanche comme la cire; la laine et tous les poils blancs; les yeux rouges et chassieux." He saw better by moonlight than sunlight. (Castel's Case, reported by De Castillon, *Hist. de l'Acad. Royale des Sciences*, Berlin, Bd. XVIII., 1769, *Class. de Phil. expér.*, pp. 99—105.)

Fig. 291. A negress aged about 28 gave birth on June 13, 1760, to twins equally large, well formed and "d'une beauté accomplie"; the first was a daughter black as her mother, the second born $\frac{1}{4}$ hour later, a boy as white as a European. The daughter had all and the son (according to Fermin) no negro traits. Fermin holds it to have been a case of superfetation due to a white man. But this would have produced a mulatto, and we have other instances of albino-normal twins. (*Hist. de l'Acad. Royale des Sciences*, Berlin, Bd. XVIII., *Class. de Phil. expér.*, 1769, p. 105.)

Fig. 292. Negro girl, Quercana, born of very black parents in Africa, aged 12—14 years. White skin, coloured with "un léger incarnat aux sanguines." She had not the smell nor softness of skin of negro. Hair like negroes short and woolly, colour "un peu plus roussé que celle de la laine qui est sur le mouton; les sourcils et les cils couleur de même laine, mais plus blanche." The eyes have now and then an involuntary movement, "ne clignent pas, ne sont point incommodés par la grande lumière, et ne sont ni miopes ni prostriles." This seems to indicate a not complete albinism of the eye, but complete for skin and hair. No account of siblings. (L'Abbé Dicquemare, *Observations sur la Physique*, T. XXXII., p. 301, 1788.)

Fig. 293. Two albino negresses, twins, aged 18 to 20 years, seen in 1770 at Guadeloupe by Valable. No details given and no account of siblings. (Cited by Arthaud, *Observations sur la Physique*, T. XXXV., Paris, 1789, p. 277.)

Fig. 294. Two completely albinotic negroes (Creoles), father and daughter, natives of Trinidad, West Indies. Skin dirty white and freckled, "eyes pink," hair sandy coloured, curly; bright light disagreeable. The father (I. 1) has been dead some years; the daughter (II. 1) is living, is married to a black man and has black children by him. (Dr R. H. E. Knaggs, Trinidad, April 1907.)

PLATE XXIX. Fig. 295. Incomplete albinism (*marked on plate as complete*) affecting chiefly the eyes, and occurring only in males; descent through unaffected females. III. 22, aged 8 (1906—7), lateral nystagmus, slight pinkish reflex from pupils, irides gray, hair now a light shade of dull brown (light mouse-colour) but was formerly lighter; decided lack of pigment in choroids especially at periphery, optic discs appear rather high coloured by contrast; refraction R. mixed As., My. 1.75 D. vertical, H. 1 D. horizontal, V. corrected $\frac{6}{24}$ partly; L., H. As. 2 D. horizontal, V. corrected $\frac{6}{24}$ partly. III. 20 was seen and found to have nystagmus in 1905, died of phthisis June 1906, aged 17. III. 24, aged 20 and 29, aged 9, also seen. IV. 1, aged 15 months when seen in 1906, had then nearly white hair,

¹ Chardel, *Journal de Médecine*, ... T. XI. p. 18.

gray irides, slight pink reflex from pupils, and nystagmus. None of the five affected with nystagmus in I. and II. have been seen, I. 3 and II. 3, 5 and 9 are dead, but the history of moving eyes seems trustworthy. No history of nystagmus or defective sight in any other males nor in any of the females. Prevalent colour of hair in living members of II. (II. 4 and 7) and in III. a lighter or darker, dull "mousy" brown getting darker with age; eyes gray or gray-blue in all, none known to be brown. IV. 2 seen when 6 weeks old (1907) had yellow hair (not so light as IV. 1 at 15 months old), gray-blue irides, no red reflex from pupils, no nystagmus. (Mr Jameson Evans, Case 1.)

Fig. 296. Albinos in the 1st and 5th generations, the three intervening generations being free. V. 1 complete albino seen by E. N. at age of 10 and several years later by Dr Stainer who worked out the pedigree. I. 1 maternal great-great-grandfather is known to have been an albino. He had two sisters (I. 2 and 3) who are believed to have been albinotic but wore dark wigs. (Dr E. Stainer and E. Nettleship.)

Fig. 297. Two albinos in a sibship of five. III. 1, aged 23 (1898), highly educated, clever and healthy; is a private tutor; hair quite white, irides translucent, fundus seems entirely devoid of pigment; no nystagmus and no photophobia in ordinary light; refraction high H. As., R. H. 3 D. vertical, 6 D. horizontal, V. corrected $\frac{6}{35}$; L. H. 4 D. vertical, 7.5 D. horizontal, V. corrected $\frac{6}{18}$. III. 3 an albino who died at 4 months old. The three intermediate sibs (III. 2) dark brown hair and good sight. Father (II. 3) light brown hair, light blue-gray eyes, good sight; his sibs (II. 4) rather fair. Mother (II. 2) very fair golden hair, but eyebrows and lashes black or dark, eyes dark blue; she had 13 sibs (II. 1) mostly fair, two or three of them very fair. No albinos known in the previous generation which contained at least two very large sibships (I. 3—4 and 5—6). (E. Nettleship.)

Fig. 298. Four male albinos in a sibship of 11. The parents, I. 1 and I. 2, were both dark. No albinos known in either stock although I. 1 and 2 made many enquiries; they do not, however, belong to a class which preserves long family records. The four albinos are complete, nystagmus, photophobia, myopia, red pupils. II. 2, 4, 6 and 8 are in correct order of age, II. 10, 12, 14 were younger and in order placed. But II. 11 and 16 died as infants, they were born between the albinos "so that there was a dark one and then a white-haired one." All four albinos are married and have 17 normal children. II. 12 and 14 are also married and have normal children. Photographs seen of practically all members of Generations I., II. and III. There were no cases of tuberculosis, mental defect, fits, or of any form of abnormality in the albino sibship, or in the offspring of this sibship. II. 10 is dark; II. 12 very dark, his sons III. 12 all dark but one, who is fair, but not very fair; II. 14 and his wife are very dark and their offspring, III. 14 and 15 are dark; the albino II. 2 has married a dark wife and has dark children; the albino, II. 4, has children, III. 3—5, dark or very dark. Beyond the statement that the children of II. 6 and 8 were normal, more detail could not be obtained, and the informant, II. 4, slackened in his communicativeness, when he was asked for hair-samples. He had been given "black tablets" by a "doctor" to produce pigmentation, but had not benefited by the experiment. I. 1 was a native of the Isle of Wight, and I. 2 from County Durham. No consanguinity. (Karl Pearson.)

Fig. 299. A complete albino, II. 3, with two half siblings normal, II. 1 and II. 2, the latter dying under a year; all three, the illegitimate children of a woman in Göttingen by three separate fathers, of whom nothing is known of the first two I. 1 and I. 2; but the father I. 3 of the albino was seen, aged 31, tailor, healthy, no disease, "capillis fuscis oculisque ravis"; Mother (I. 4) aged 31, "robustiore corporis fabrica sano rubroque colore, subfuscis capillis et oculis caeruleis," catamenia from 14 and lately profuse, three confinements with great labour. II. 1 subject to scrofula, of slight but not weak physique, with blue eyes and "capillis cincinnatis flavisque." The albino II. 3 had skin like that of a very light blond, no down on body, nor "scaling," not more scrofula than often occurs in young children; he was a robust and vigorous infant, slight psorophthalmia; hair of scalp, eyelashes and brows white and long for eight months; photophobia, nystagmus; irides: at small circle iris is violet coloured, at circumference small and narrow blue lines, general colour of iris rose; "pupilla non aequae caeruleo colore atque iris est, sed fuscior, colori succi e rubis Idaeis parati similis." (C. Ernst, *De Leucosi*, Inaug. Diss., Göttingen, 1830.)

Fig. 300. Jewish albino girl from Algiers, aged 15, born of normal parents. Four siblings, two living and well, two dead, none albinotic. The whole body "d'un blanc mat, les yeux très rouges, les cils et les sourcils d'un gris de lin, aussi que les cheveux." Eyes very sensible to light, shaded by hand even in moderate light; and no alteration in this with age. Constitution good and excellent health. (Dr Guyon, *Gazette médicale de Paris*, T. VII., p. 730, 1839.)

Fig. 301. Jewish albino girl, II. 2, Algiers, aged 6. II. 1 also albinotic died at 2 years. Three normal siblings. Description of albino as in Fig. 300. Parents normal. (Dr Guyon, *loc. cit.*)

Fig. 302. Albino Jewess, II. 3, aged 27, good health, description as before; born of normal parents, had two normal sisters, but not certain if this were whole sibship. She married a normal husband and had three healthy normal children. (Dr Guyon, *loc. cit.*)

N.B. In cases Figs. 300—302, nystagmus is not asserted or denied.

Fig. 303. Three albinos in a sibship of six. III. 2, 5 and 6 typical albinos, hair white, tinged yellow; eyes blue, pupils reddish, marked nystagmus, strabismus marked in 2 and 6, slight in 4. All three intelligent above the average, but irritable in temper and easily "put out"; ages 26, 17, and 15 respectively. Pregnancies, as far as ascertainable, normal in all cases. The general health good in all cases. III. 5, notwithstanding her age is married, but no children at date of record. Of the siblings of the albinos, III. 3, aged 24, has brown hair, gray eyes and good sight, but suffers from abscesses on neck (?tuberculous); III. 4, aged 23, fair health, adenoids?, has dark hair and eyes, slight strabismus, good sight; III. 7, dark hair and eyes, had marked strabismus, and died of diphtheria at $2\frac{1}{2}$. The mother (II. 13) of this sibship had poor health, and died of "ulceration of intestines" at 42, she was dark, strabismus, sight otherwise good. The father (II. 3), aged 48, is rheumatic, and has "heart and kidney trouble" (the latter being shared by the albino III. 2), but his general health is said to be good; he has brown hair, gray eyes and good sight. He has married again and has one boy (III. 1), half sibling to the albinos, aged 13 months, darkish hair, blue eyes, sight appears good, but he suffers from rickets. The mother of the albinos had one sister (II. 10), medium hair, and three brothers, all dark, although II. 11 has gray eyes; health fair, sight good in all, but II. 12 is epileptic. The father's sibship of three sisters and four brothers: II. 2, aged 50, is "stone deaf," good health, sight good; II. 4, aged 44, poor health, sight failing; II. 6, aged 40, good health and sight; all these sisters are dark. Of the four brothers (II. 5, 7, 8, 9) all have "heart and kidney weakness," good sight; 5 and 7 are dark; 8, fair and blue eyes; 9, fair with blue-gray eyes. There was no consanguinity in the marriages in the pedigree. There are about 40 cousins, none of whom have any approach to albinism or any gross eye defect; strabismus noted in one. The exact nature of "heart and kidney trouble" on father's side not ascertainable. District, North Shields. (Dr Amy Robinson, July, 1907.)

Fig. 304. Four albinos, three males, one female in a sibship of seven. The father (II. 3) had red hair; the mother (II. 1) black hair; the four grandparents were normal and from England. No further details ascertainable. Family at Flint, Michigan, U.S. (Karl Pearson, from Raymond Pearl.)

Fig. 305. One complete albino (III. 1), aet. 11 (1907), in a sibship of two; refraction My. 4 D. vertical, 1 D. horizontal, V. corrected $\frac{6}{15}$. III. 2 is dark. Mother (II. 3) and her two siblings fair, one (II. 1) being *very* fair. Father's family all dark. (Mr Arnold Lawson, April, 1907.)

Fig. 306. Case of incomplete albinism in sibship of 11. Male (III. 10) seen, aet. 50 (1908), with average memory and ability, good temper, keen sense of smell, good hearing, not very robust, tires readily, pleurisy two or three times, laid up seven years—between 20 and 30—with "curvature of spine"; height 5' 3"; weight 9 stone $4\frac{1}{2}$ lbs.; married, no children; hair, eye-lashes and brows yellow; skin blond, no freckles; nystagmus rotatory constant 140 per minute; no involuntary head movements; iris blue; pupils dark faint red reflex; strabismus L. divergent concomitant ("was cut for squint"); Meibomian glands clearly visible through conjunctiva; photophobia; movements of eyes full; refraction R. Em. in vertical meridian, H. 1 D. in horizontal meridian, V. with correction $\frac{6}{18}$, L. My. 1 D. in vertical meridian, Em. in horizontal meridian, V. with correction $\frac{6}{24}$ partly. Colour vision normal; fundus choroidal vessels seen. Mother (II. 4) in dotage, hair and eyes brown; father (II. 1), aet. 89, hair fair, eyes blue; I. 1, dead, fair yellow hair, gray blue eyes; I. 2 and 3, no information eyes and hair; I. 4, fair hair, skin blond; II. 2 and III. 1, fair hair and blue eyes; IV. 1 and II. 3 no information; II. 5, hair fair, eyes blue; III. 13, dark; III. 2, 3, 4, 6, 8, 11, 12 and IV. 2, 4, 5, 6 (2), 7 have fair hair usually yellow, and blue eyes; III. 3 (ob. 50) 5, 7, 9 and IV. 3, 6 (1), have brown hair and eyes; III. 9, insane, in asylum; V. 1, no information; III. 4, married, no issue; III. 4, 5 and 12 have defective vision. (C. H. Usher, August, 1908.)

Fig. 307. This pedigree depends only on an account given in a London newspaper. Through the courtesy of the editor, I was given an address where I might hear of their correspondent, but I failed to receive any answer to my enquiries. The district is not sufficiently defined in the article to enable American residents near Cape Cod to identify it, but we have succeeded in discovering an American albino family of the same name of which we publish a very ample pedigree (Fig. 412); it is not, however, the same as that described in the newspaper, although in approximately the same district. Various American newspapers giving accounts of (i) a rural, or (ii) an urban colony of albinos in New England have reached me, but although I have made a variety of enquiries, I have not succeeded in obtaining independent verification of their statements, although the same district and the same names occur in them as in the case we have well-authenticated particulars of. It is possible that our family is only a section of a larger clan, or that the American newspapers have published garbled and exaggerated accounts of this one family. Our family can hardly be that of the *Standard* correspondent, agreeing neither in members nor in environment. That he had seen albinos on his three mile walk—in which he says he visited three albino houses of the "colony"—or was otherwise familiar with them, is, I think, evident from his account of the albino eye. The nystagmus, photophobia, irides and pupil are described, in the language of a man who has seen a human albino for the first time, and not in that of a person who has got up the terminology from books. I am therefore quite unable to confirm or refute the writer's account of the "Red-eyed Pittsleys" who "have for rather over a century, formed an albino clan or colony scattered in the more retired

woodland country about Cape Cod" (elsewhere said to be a few miles beyond the "Scotland township" inland from Cape Cod,—a township I have been unable to discover). According to the writer *both* father and mother of the first albino family he visited were albinos, and seven out of their nine children were albinos. The eldest daughter was 17, she was an albino; the "two tiniest of the children" were by the description also albino; three albino girls between the ages of four and eleven are also mentioned. It seems reasonable therefore to place the remaining albino and the two normals in the gap between the albino girls of 11 and 17, but this is only conjecture. I regret that I am merely able to say of this single reported instance of the intermarriage of albinos that it remains a newspaper report only. (Extracted by K. Pearson from "The Albino Colony," *The Standard*, September 13, 1904.)

Fig. 308. Four complete albinos in a sibship of eight; three living, one, II. 2, died aged two years. II. 3, a priest; II. 6, aged 13, with typical appearances and symptoms, refraction My. 5.5 D. vertical, 2 D. horizontal, V. corrected $\frac{6}{35}$; II. 7, aged 11, typical, refraction My. As. 2 D. vertical, V. corrected $\frac{6}{35}$. Mother dark, father dark hair, bluish eyes. No known consanguinity and careful enquiry has failed to disclose any other cases. (Mr J. Wharton, 1907.)

Fig. 309. A partial albino (II. 5) and a case of possibly complete albinism (II. 1) (stated to "have white hair, bad sight and spectacles"). The other children (II. 2, 3, 4) said to be of very light complexion. II. 5, aged six months (1905), had "wobbling" eyes a month after birth; when seen, in good health, normally developed skull, lateral nystagmus, responding readily to flash test, much compound hypermetropic astigmatism, choroidal vessels unusually distinct, except in yellow spot region. Hair, eyebrows and eyelashes although not actually white, were light coloured; "the iris contained a certain amount of pigment having a bluish tinge." (Dr Sydney Stephenson, "On some of the Diseases and Injuries of the Eye peculiar to Children," *British Journal of Children's Diseases*, 1905, Offprint, pp. 28—9.)

Fig. 310. Three partial albinos in a sibship, not certainly known to consist of these three only. II. 3, aged six years, had slight chronic palpebral conjunctivitis with the Morax-Axenfeld diplo-bacillus in the scanty mucous secretion. Lateral nystagmus, 3.5 D. of hypermetropia; reddish hair, eyebrows and eyelashes; iris blue gray, choroidal vessels visible all over each fundus, except in yellow spot region. II. 2, the younger of the two sisters, aged 10, presented nystagmus and shaking movements of head, light hair, blue irides, pigmented cilia, and albinotic type of fundus, 2.5 of hypermetropia in R.; in L., the same with 1 D. of astigmatism, axis vertical. II. 1, aged 11, manifested very similar general and ocular conditions. (Dr S. Stephenson, *loc. cit.*, Fig. 309.)

PLATE XXX. Fig. 311. Three albinos in a sibship of five. IV. 15, aged 39, single (1907), a well-educated, trained nurse; hair extremely fair flaxen, was never quite white, eyebrows and lashes the same; irides light blue-gray, pupils pink in daylight; nystagmus; refraction high simple H. As. R. about 4 D., L. 5 D. horizontal, V. not noted; colour vision normal. IV. 17, aged 34, single, very intelligent clerk; details of albinism exactly as in the preceding; refraction high compound H. As., R. H. 3 D. vertical, 6.5 D. horizontal, L. H. 5 D. and 7 D. correspondingly, V. corrected $\frac{6}{35}$. IV. 14, an albino who died at three months. Their sibling (IV. 13), aged 43, brown hair, gray eyes, married, two children (V. 6 and 7), aged 12 and 8, brown hair, blue eyes; their mother (IV. 12) brown hair and brown eyes; IV. 16, aged 37, single, brown hair, gray eyes, is congenitally colour-blind and has had to change his original occupation (buyer for a textile fabric house) to one in which colours are not in question; on examination confuses green wools with gray and blue; names five colours in the spectrum, his "light red" and "pink" occupying the orange, yellow and green. Father (III. 4) dead, hair- and eye-colour not known, married twice; at age of 24 to first wife (III. 3) of same age, not a blood-relation, hair and eye-colour unknown, four children (IV. 7 to 10) all brown hair and gray eyes; to second wife (III. 7) at 35, she being 21, his first cousin, and mother of the albinos. Hair- and eye-colour of others: only one called fair (III. 8); all the others described as brown or dark hair and gray eyes (except I. 1 whose eyes were brown). Note that the other cousin marriage (III. 5 and 8) has given only two children (IV. 18 and 19), both now adult. Of V. 1, 2, 3, one died of measles, another diphtheria, one living. V. 4 had an operation for "curved foot," and died at six months old; 5, died at birth. V. 6 and 7 living and well, aged 12 and 8. The colour vision was tested in the following on 6 July, 1907;—IV. 16 (see above); III. 6 twice compared pale green with yellowish buff, but did not finally confuse them ("weak colour-sense" of Holmgren), saw the usual six colours in the spectrum; IV. 13, 15, 17, V. 6 and 7, all quite normal to wools and spectrum. (Mr Holmes Spicer.)

Fig. 312. Two albinos out of seven, one (V. 6) with club foot, died young; the other (V. 5) grown up. One normal (V. 7) had club-foot and died young. The parents were first cousins, and the paternal grandparents also. The firstborn sibling has married a second cousin, and has VI. I, a non-albinotic child. The pedigree as far as it has been possible to form it is given with *lacunae*. V. 2 is very dark; V. 3, medium; V. 4 fair; V. 8 is a son of medium colour; V. 5 has a normal moderately fair wife; IV. 2 is dark, no record of her siblings; IV. 3 the father is fair; he is one of a sibship of ten, five sons and five daughters, *not detailed in pedigree*. One of the brothers is red haired and has children who are

red or very fair; three others though dark themselves have fair or very fair children. Four of the sisters are fair, one very fair, and have children fair, some decidedly fair and at least one red; a fifth sister married her first cousin and has dark children, one of whom has again married her first cousin. Beyond III. 5 and 6 who were first cousins the material is rather meagre, but albinism was said not to be known. There is a report of some dark blood in the very distant ancestry. The pedigree is a remarkable one for much consanguineous marriage, and emphasis must be laid on the fair to red element. (K. Pearson.)

Fig. 313. This is the remarkable Chassot, Rey, and Chaney family pedigree recorded by Cornaz. In 1849—50 there were eight albinos in this group. I. 1, Jean Chassot of Bussy, had three daughters and two sons. One of the daughters, named Françoise (II. 5), married Jacques Laurent Rey of Montet (II. 8) and had four sons (III. 5, 6, 7, 8'), and two daughters (III. 9 and 10). The four youngest had normal offspring only; we are solely concerned with the two eldest, Jacques (III. 5) and Charles (III. 6). These brothers Rey married the two daughters (III. 14 and III. 13) of Lieutenant Chaney, father of six children, none of whom except the two daughters marrying the Reys had albino offspring. Jacques Rey (III. 5) had six² children by his wife (Françoise Chaney, III. 14); IV. 5, Laurent (normal), who married and had eight or nine normal offspring; IV. 6, Marguerite (albino, dead); IV. 7, Jacques (normal); IV. 8, Jean Louis (albino, aged about 25); IV. 9, Marie (albino, aged about 20); IV. 10, Nicholas (normal), who married and had eight or nine children. Cornaz did not see the living albinos of this branch; it is unknown whether they eventually married. Charles Rey (III. 6), who married Susanna Chaney (III. 13), had seven sons, all normal (IV. 12—18). Of these five married, but Cornaz gives no account of their descendants, except in the case of IV. 18, Jean (*dit* Jeannet), who married Marguerite Rey the first cousin of his father, and by her had 12 children (IV. 3—14), of whom 4 girls were albinos. The eight normal children were: V. 3 Marie, V. 5 Joseph, V. 8 Nanette, V. 9 Célestine, V. 10 Joséphine, V. 11 Jacques, V. 12 Ursule, V. 14 Pierre; of these Joséphine and Ursule were dead. The four albinos were Françoise (V. 4), aged 32; Marguerite (V. 6), aged 27; Madelaine (V. 7), aged 25; Thérèse (V. 13), aged 14. The father (IV. 18) had blue eyes; the albinos had *la taille élancée* and the features of the father. The mother (III. 11) was short and brown eyed; with the exception V. 5, who has blue eyes, all the normal children had the brown eyes of the mother and they had her short stature; some had fair, others had dark chestnut hair.

Returning to the sons of Jean Chassot (I. 1), the eldest, Jean (II. 2), had six sons and one daughter; the second Jean Baptiste (II. 3), had only a single daughter, and her descendants have been all normal. One³ son of Jean Chassot the second (II. 2), Jean-Pierre (III. 3), married a Planceval, and had three daughters: Josephine (IV. 1), aged 21 (in 1849), an albino, and Henrietta (IV. 2), a brunette, and Nanette (IV. 3), a blond. Cornaz gives no account of the descendants, if any, of II. 6 and 7 or III. 1 and 2.

Cornaz studied especially Joséphine Chassot (IV. 1) and Françoise Rey (V. 4). Joséphine had a fall from the cradle which had left a lameness of the right leg; ophthalmia at two to three years which extended to both eyes, the left still preserving traces, the lower part of the cornea being covered by an opacity which hid a good part of pupil and sensibly affected the sight; no affections of the skin or other eye troubles; first appearance of catamenia at 16; intelligent and cheerful; skin of face white, rose on cheeks, which colour also in less degree existed in hands and forearms; hair of scalp, colour of tow (i.e. *d'un blond grisâtre clair*), eyelashes and eyebrows pure white almost. She was myopic, must read very close to the eyes, could distinguish colours well, and asserted that she saw better by moonlight than daylight; horizontal nystagmus. The following is Cornaz's description of the eyes: "La conjonctive palpébrale offre une légère injection vasculaire, la caroncule lacrymale est très-pâle; le cercle pupillaire, qui est blanchâtre, sert de point de départ à des fibrilles rayonnantes, qui s'anastomosent sous forme d'anneaux avant d'atteindre le bord ciliaire irien; celui-ci est d'un rose carné, tirant sur le grisâtre et interrompre par de fines lignes blanchâtres, ce qui ressemble assez bien à certaines agates: la pupille est rouge et arrondie, dirigée un peu trop en haut et en dedans (corectopie); les deux iris réagissent suffisamment selon l'intensité de la lumière à laquelle ils sont exposés" (p. 306).

Françoise Rey (V. 4) had a skin less white than IV. 1. Neither skin nor eyes had been subject to any malady. Catamenia commenced between 14 and 15 years; slight hand deformity, probably due to muscular displacement. Hair, "d'un blond extrêmement clair," eyelashes and eyebrows white, irides of clear rose like IV. 1 with "fibrilles rayonnantes qui traversent tout le voile irien; le cercle pupillaire est plus blanc encore, et les pupilles, régulières de forme et de position, sont rouges" (p. 307); nystagmus, which increased, if she moved or was animated; slightly myopic—ordinary print at eight inches; did not see better at dusk than in daylight; distinguished colours. V. 6 and V. 7 presented the same features, and V. 13 had great analogy with her elder sisters. Origin of family, Canton Fribourg, Switzerland. (E. Cornaz, *Annales de la Société de Médecine de Gand*, T. xxxiii., 1855, pp. 303—8.)

Fig. 314. At the end of the 18th century a certain Claude Joseph Chaney had six offspring, II. 1 Claude albino, II. 2 Jacques normal, II. 3 Marguerite albino, II. 4 Susanne normal, II. 5 Jean albino,

¹ By a slip of the engraver III. 8 has been given the female symbol.

² Cornaz says five but gives the names of six.

³ Cornaz says, "Jean-Pierre, one of the two sons of Jean Chassot the second." He has said immediately above that he had six sons (*loc. cit.*, *infra*, p. 303). Perhaps four died.

II. 6 Marie normal (*marked male on plate by a slip of engraver*). They are now (1850) all dead, the three albinos without marrying, and without albinism reappearing in the offspring of any of the other three. Cornaz did not apparently succeed in linking this family with the Chaney group of Fig. 313. But they belonged to the same district, living at Montet in the neighbourhood of Estavayer, Canton Fribourg. (E. Cornaz, *Annales de la Société de Méd. de Gand*, T. xxxiii., p. 308; Blumenbach, *Medicinische Bibliothek*, T. ii., p. 545, 1786, refers also to this family.)

Fig. 315. Jean Brand, an albino, aged 10 (in 1848), seen by Cornaz in a school for the blind at Berne. Skin white, recalling wax figures, cheeks light rose; hair of "un blond très-clair"; iris and pupils had the characters of complete albinism. Eyelids closed during day, but he saw well enough at dusk and could guide himself during the day. He was the son of an albino, who exhibited himself about Switzerland as a curiosity and a peasant girl from the neighbourhood of Berne. (E. Cornaz, *loc. cit.*, pp. 300—1.)

Fig. 316. A female albino, III. 2, aged 13 months, in a sibship of seven, the normal children having brown hair and eyes. II. 2, her father, has dark brown eyes and hair, as also his wife (II. 3); neither have had any eye affection of importance. The paternal grandfather (I. 1) lost his sight from scrofula, which II. 2 inherited. The paternal grandmother had chronic ophthalmia. The infant albino is intelligent and has had no other illness than ophthalmia at 6 months during which, according to the mother, "les paupières furent longtemps collées et ne s'entrouvraient que pour donner issue à une matière puriforme." Skin very white, but exhibits "petites taches lenticulaires rousses"; cheeks slightly rose; hair very silken and dazzlingly white. Horizontal nystagmus, developed photophobia, rose irides; "les cercles pupillaires offrent un rebord blanc, qui à l'œil gauche n'atteint pas partout le bord de la pupille, qui en paraît déformée." No other albino known in family. Mother recounted that 15 days before birth, she had seen at the fair, the representation of St Antony and had been much impressed (vivement impressionnée), because suddenly the lights were all extinguished, to be relighted immediately after. From Viols-le-Fort, Département l'Hérault, residing at Montpellier. (E. Cornaz, *loc. cit.*, p. 299.)

Fig. 317. Two albinos in a sibship of four, heard of at Montpellier in 1848; II. 1, an albino, dead. II. 2, aged 20, marked albinism, the other two children normal with very dark eyes. I. 1, not referred to, was presumably normal. (E. Cornaz, *loc. cit.*, p. 299.)

Fig. 318. A pedigree given by Dahl, showing mental defect in three stages of four generations and a second cousin marriage in Generation IV., leading to an albino. (Ludvig Dahl, *Bidrag til Kundskab om de Sindssyge i Norge*, Slaegt No. 7, p. 87, Christiania, 1859.)

Fig. 319 = Fig. 216. Three albinos, II. 1, 4 and 5, in a sibship of four, in a generation collateral to the paternal grandmother II. 2 of a sibship with two albinos IV. 2, 3, and one idiot IV. 1. The latter albinos have an idiot cousin IV. 5 and a second cousin, IV. 7, who is a deaf-mute descended from an albino brother of the grandmother. This pedigree has been used by Dahl and other writers to suggest that albinism is closely associated with idiocy or deaf-mutism. (Ludvig Dahl, *loc. cit.*, Slaegt No. 6, p. 87; Holger Mygind, *Deaf-Mutism*, London, 1894, p. 76; J. Kerr Love and W. H. Addison, *Deaf-Mutism*, 1896.)

Fig. 320. Two eldest born, V. 1 and 2, are albinos in a sibship of six. The parents, IV. 2 and III. 4, have blue eyes and black hair and the mother's mother and father's grandmother were sisters. The other four youngest siblings have eyes and hair like their parents. No other albinos known. Place of origin, Urbino. (K. Pearson.)

Fig. 321. Girl, aged one year, born at Rennes in Brittany. Skin "blanc mat"; hair, colour like cream; photophobia, nystagmus, irides light rose, and pupils "un rouge plus vif"; health good. Parents both brown and in prime of life; they have several other children perfectly constituted. (Dr F. Chardel, *Journal de Médecine, Chirurgie, Pharmacie*, T. xi., pp. 18—20, Paris, 1806.)

Fig. 322. Two albino boys in a sibship of nine, the other seven siblings normal, order of birth not given. No other known albinos in family. (Dr Radcliffe Crocker, Letter of February, 1906.)

Fig. 323. *Incomplete albinism*. I. 1, fair hair, blue eyes; her mother (*not shewn*) was very fair like I. 1's two white haired granddaughters (III. 6 and 8). I. 2 very dark. I. 3 living, very fair. I. 4, husband of 3, was fair and lived to 93.

II. 1 to 8, issue of I. 1 and 2; only four now living, viz.: Nos. 3 aged 45, 5 aged 43, 6 aged 42 and 7 aged 40. II. 2 dead, left two living children both dark and had many others who died (III. 1 and 2). II. 3 aged 45 no issue; very fair and "eyes shine in the dark." II. 5, aged 43, very fair and eyes like II. 3: 4 children (III. 3), none very light. II. 6, aged 42, hair formerly auburn, now dark; 10 children (III. 4) none very fair and several quite dark. II. 7, aged 40, brown-gray eyes and very dark brown hair: married II. 14, now aged 42, with fair hair and bright blue eyes. They have four children all well grown and developed (III. 5 to 8) of whom III. 5 aged 13 had hair dark at birth, now light brown, dark blue eyes, good sight; III. 7, aged 9, hair dark at birth and still very dark, good eyes. The other two are semi-albinotic with nystagmus and bad sight; III. 6, aged 11, well grown, hair white at birth, now light brown, eyebrows and lashes the same, irides pure blue and pupils were never red, fine rotatory nystagmus; refraction high H. As. nearly same in each eye. H. 1 to 2 D vertical, 4 to 5 D.

horizontal, V. corrected $\frac{6}{24}$; III. 8, aged 8, hair white at birth and still very fair, irides light blue, pupils never noticed to be red, fine rotatory nystagmus, refraction very high H. with As. R. H. 6 D vertical, 9 D. horizontal, L. H. 7 D. vertical, 11 D. horizontal, V. corrected $\frac{6}{24}$ and $\frac{6}{36}$. II. 8; two children of whom one died in early infancy, the other at $3\frac{1}{2}$ years of small-pox; II. 4 died at four and would now be 44. Of the sibship II. 9 to 17 (of which 9 to 16 are living and aged between 66 and 35 years, 10 has dark hair and dark eyes; one of 11, 12 and 16 brown hair and blue or gray eyes; the remaining seven fair hair and blue eyes, both of 15 being described as "very fair." No known consanguinity anywhere; I. 2 and I. 4 were from widely different parts of the country. No information about children of II. 9—16 (except 14) but none are albinos. (Mr Holmes Spicer, May 1907.)

Fig. 324. Incomplete albinism. IV. 1, hair pale-flaxen; irides pale blue; constant nystagmus; fundus markedly albinotic; aet. $2\frac{1}{2}$ years. No previous albinism known but all those half blacked are described as fair, the others being dark. The child's father (III. 1) is described as "auburn." Children of III. 6 and 7, medium dark. (Mr A. Levy, *Trans. Ophth. Soc.*, xxvii., 220, 1907.)

Fig. 325. Inheritance of very fair, or white, hair; eyes not albinotic. IV. 3, female, aged 18, very fair flaxen hair, fairer than in some albinos; irides blue, pupils black, no nystagmus; refraction mixed Astigmatism H. 2 D., My. $3\cdot5$ D. in R., V. corrected $\frac{6}{36}$; H. 1 D. My. 5 D. in L., V. corrected $\frac{6}{12}$; axes oblique in both eyes. She is the third of four (IV. 1—4) of whom the second, IV. 2, aged 20, has very fair hair and blue eyes like herself, the other two, aged 21 and 14, "nutbrown" hair and blue eyes. Mother (III. 2) seen, hair nearly as fair as IV. 3, blue eyes; was 24th in a sibship of 25 of whom about 14 grew up and of them about half were fair; only two besides herself now living and they have medium hair. Father (III. 4) also fair hair and blue eyes but neither his parents nor any of his four sibs fair, "he was the only fair one on that side." Mother's father (II. 2), one of three; all three fair, as were both their parents (I. 1 and 2); II. 3 had perfectly white hair all her life, "as white as that coat," pointing to pure white washing jacket worn by one of the surgeons; she lived to be old; neither she nor any of the fair ones had pink or moving eyes or bad sight. Mother's mother (II. 1) and her people "not dark." (Mr C. D. Marshall, Jan. 1908.)

PLATE XXXI. Figs. 326—328. Three pedigrees of albinism in villages on the coast of Kadavu, one of the largest of the minor islands of the Fiji group lying 40—50 miles south of the main island of Viti Levu. From Mr W. Allardyce, one of the non-medical officials of Fiji personally known to C. H. Usher and instructed as to desiderata by him when he was in Fiji in 1907. Notes sent from Fiji on 3rd October 1907. Mr Allardyce took the notes during an official tour and sent them off within a day or two of his return to the Capital, Suva, together with the Map on p. 49. Mention also made of five single cases and hearsay report of two other cases in Kadavu.

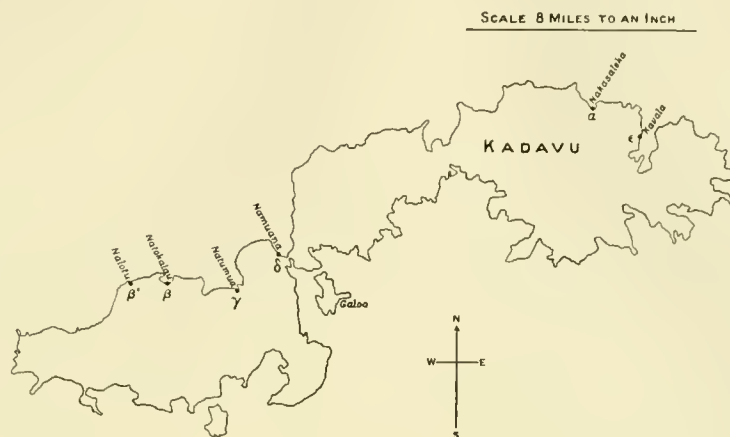
Fig. 326. Albinos from village of Nakasaleka, Island of Kadavu, Fiji. (See Map, *a*.) II. 8, a male albino, nurtured with great care because he was thought to have brought luck to the tribe, but died as a child. His father (I. 4) had two brothers (I. 2 and 5) of whom I. 2 married twice, the first wife (I. 1) belonging to a different Matagali from her husband, and the second wife (I. 3) coming from a different part of the island. None of the children or grandchildren of I. 2 were albinotic, but three albinos (IV. 1, 4, 8), all dead, occurred in a sibship of nine, the issue of a grandson (III. 5) of I. 2 by his second wife in direct male descent. Of the nine (IV. 1—9) only No. 7, aged about 15, is living; 5 and 9 were still-born; 1, 2, 3, 4, 6, 8 are dead, but no information given as to how long they lived. Information from III. 5.

Fig. 327. Albino, Sevulosi, from the village of Natokalau, Kadavu. Natokalau is about 20—25 miles west of Nakasaleka (see Map, *β*). III. 3, Sevulosi, the only living albino, had two albinotic sibs; his age not stated. I. 1 and 2 were from different villages, I. 1 was from Nalotu, one to two miles west from Natokalau (see map, *β'*). I. 3 and 4 were from same village but different Matagali. II. 2, father of the albinos and I. 3, his wife's mother, belonged to the same Matagali; but II. 2 and his wife 3, were of different Matagali. III. 2 and 3 were twins.

At Nalotu, the village from which I. 1 came, there was an albino girl who died 30 years ago; she is believed to have belonged to a branch of same Matagali as I. 1 which is also the Matagali to which Sevulosi (III. 3) belongs. The god of the people of Natokalau (Sevulosi's village) is an albino, and it is said that the village of Naigani on Batiki where there is an albino (see Fig. 385) has the same god.

Fig. 328. Albino woman, Keleni Radinilevuka of Natumua, Tavuki, Kadavu (see Map, *γ*), 2—3 miles east from Natokalau. I. 1 and 2 probably cousins, certainly belonged to same Matagali. I. 5 and 6 both came from same village which was also the village of I. 1 and 2. Thus, although 5 and 6 were of two Matagalas, it is almost certain that all four (I. 1, 2, 5 and 6) were connected by marriages in the past. II. 2 and 10, same village but different Matagalas. II. 9 and her husband (not shown) belonged to same Matagali. III. 3, Keleni, albino, is married to a normally pigmented man, and her two children (IV. 4 and 5) are normal. No members of this pedigree were seen by Mr Allardyce.

Fig. 335¹. Albinos at the village of Namuana (see Map, δ), Tavuki, Kadavu, 2—3 miles east of Natumua. I. 1 and II. 1 and 2 died within the memory of people now living, II. 2 and 3 twins; II. 3 married a normally pigmented woman but had no issue. The above four albinos all belonged to the same Matagali, but it is not certain that the generations I. and II. were consecutive.



There was another male albino in the same village who died a year before Mr Allardyce's visit. The Matagali he belonged to was connected with but not the same as the one to which the four albinos shown in Fig. 335 belonged. No further information could be obtained as many of the people of the village were away at the time.

It is said that there was a female albino at Kavala (see Map, ϵ), but she died many years ago. Also an albino is reported at the present time on the small island of Galoa (see Map), but no particulars were obtainable, when Mr Allardyce wrote. (See *supra*.)

Fig. 329, *a, b, c, d*. Albinos at Noco, Fiji, in the S.E. corner of the main island, Viti Levu. The Cases (i, ii, iii, iv) forming Fig. 329 were originally communicated by Dr A. Montague in 1906. When C. H. Usher was in Viti Levu in the summer of 1907 he, with Dr Montague, was able to go over the pedigree again, amplify it and add a new complete albino and a new incomplete one. The bulk of the persons in Fig. 329 belong to the same Matagali or tribal division and are therefore more or less related to each other by blood, but no written records of such kinship are kept. (See below for particulars as to individuals.) Marriage between members of the same Matagali is very frequent but there is, Dr Montague says, no rule about it. Land owned by a Matagali belongs to all its members in common. No one enters a Matagali except a female who marries a member of it. A Matagali may consist of a few, or several hundred, persons; and there may be two or more Matagalas in the same village. There are subdivisions in most Matagalas, and when, in reply to enquiries, two persons are said to belong to the same Matagali it is probably meant that they belong to the same subdivision. In 1906 Dr Montague stated that at that time there were about twenty living adult males in the Matagali containing the albinos shown in Fig. 329.

Fig. 329 *a* (Case i.). An albino with two incompletely albinotic children; none of the three now living. III. 1 was an albino named Vilimone who died soon after the introduction of Christianity, *i.e.* about 60 years ago; he was converted and became a teacher. He had two children, a boy and a girl (IV. 1, 2), who had blue eyes and skin "like a Tongan in colour" and may therefore be taken to have been incompletely albinotic²; they both died young and unmarried.

Fig. 329 *b* (Case ii.). A female albino, an only child, who died young: mother (I. 1) was from Rewa.

Fig. 329 *c* (Case iii.). Four albinos (IV. 3 and V. 1, 2, 3) in two generations, all descended on maternal side from III. 4. The three women, III. 4 and IV. 3 and 4 belonged to the same Matagali, the one to which also the albinos III. 1 (Case i.) and 3 (Case ii.) belonged; the two husbands III. 5 and IV. 5 were also from one Matagali but not the one to which their wives belonged; IV. 5 had a brother (IV. 6) who left no children. The albinos in this Case are all dead.

¹ Taken out of order because associated with Figs. 326—328.

² The Tongans usually have a less darkly coloured skin than the Fijians, though their irides are, as in Fijians, very dark brown, "almost black." Information in a letter from Dr Glanville Corney.

Fig. 329 *d* (Case iv.)¹. Three albinotic siblings, apparently the only children of their mother IV. 17. V. 8, Louisa Lagivoro, aged 7½ years (1907); skin blond, very fair, small freckles on brow and cheeks, none on trunk, arms or legs; iris pale blue; constant lateral nystagmus; fundus pale and choroidal vessels exposed; refraction slightly H. with but little As.; hair of head curly, finer and less stiff than ordinary Fijian hair, almost white at the roots but pale golden, or light yellow-brown, towards the ends, eyebrows still paler and eyelashes almost quite white; she is intelligent and well developed (photograph). V. 9, Wainikiti Lewadamu, aged 4 years; skin very fair, some minute freckles on back of neck, none anywhere else; hair curly and slightly coloured as in V. 8, lashes white; iris light blue, constant lateral nystagmus; photophobia and tends to keep R. eye closed; refraction slightly H. with but little As.; fundus albinotic as in V. 8; a well developed child (see Plate S.). V. 10, Gasagasa, female, aged 3 months (August, 1907), illegitimate daughter of same mother (IV. 17) by a different father (IV. 18); well nourished and lively; skin very fair, no freckles anywhere; hair, brows and lashes yellowish; slow lateral nystagmus; refraction H.; fundus albinotic as in her two sisters. Mother (IV. 17), seen, from Noco, is not so dark as the other natives, but her iris is dark (Photograph with her baby V. 10 on Plate S.). The albinos III. 1 and IV. 1 and 2 of Case i, III. 3 of Case ii, IV. 3 of Case iii were all members of the same Matagali as II. 16 of Case iv the maternal great-grandfather of the albinos V. 8, 9 and 10 (of Case iv). It therefore follows that all the eleven albinos shown in Fig. 329 were more or less consanguineous. In Case iv, II. 10 and 13 were not cousins; II. 12, 15 and 17 had no issue; I. 1, 3, 4, II. 18, III. 6, 9, IV. 5 and 6, were all from Noco or close to it, but not all of same Matagali. II. 7 from Batiki Island. II. 10 and 13 not cousins. (C. H. Usher and Dr Montague.)

Fig. 330. III. 2, a male albino, Sesario Tubailagi, died 1905; he was an only child and the only albino in the village (Vutia, five miles from Rewa, Fiji). Parents (II. 3 and 4) normal, were both from Vutia but of different Matagali. Father (II. 3) had a brother (II. 2), but mother (II. 4) was an only child. No known consanguinity. (C. H. Usher, 1907.)

Fig. 331. On August 20, 1907, C. H. Usher was on the south end of Koro island (Fiji) and was told of two albino sisters, the elder aged four years, at Sinuvaca village, but was not able to go to the village; they were described as "quite white," their parents being normal.

Fig. 332. The albino IV. 6, Joseva Maluwa of Nausori (Fiji), is now dead, but Dr Montague has seen him; he was not married. His father (III. 8) an only child; father's father (II. 5) no details, nor of his siblings; father's mother (II. 7) was in an earlier generation of same Matagali as II. 2, the albino's mother's father who was the first born of his sibship. Nothing known of the sibs of II. 1, the albino's mother's mother. The tradition is that there were albinos far back on father's side and that IV. 6 is the third. (C. H. Usher, 1907.)

Fig. 333. Mereone Sinudamu, V. 5, of Drekena, village in Rewa, a district near Suva in the island of Viti Levu (Noco is in the same region of Viti Levu); well nourished female albino, aged three months (1907), seen by C. H. Usher, who found:—skin very fair all over, no freckles or pigment spots anywhere; hair light yellow, lashes white; eyes photophobic, slow lateral nystagmus; iris gray, pupils small; fundus could not be examined. Father (IV. 3) intelligent, normally coloured, gave much of the information as to pedigree with help from elders. Mother (IV. 9), skin much lighter than that of any of those sitting around (except one girl (V. 6) who is a descendant of I. 2, but the exact relationship not determined). I. 1 was an albino; her origin not known but her husband was from Drekena village; I. 2, II. 4 and II. 7 (an only child) were from Rewa village or district; II. 6 and III. 10 from Drekena village; II. 2 (an only child) from Kadavu Island; not known whether related to any of the albinos there (see Figs. 326—8, 335); I. 3 and 4 were from same Matagali in a village near Drekena; II. 3 was from Noco. II. 1 and 4 were of same Matagali; the husbands of I. 1 and II. 8, and IV. 3 (father of albino V. 5) were all of same Matagali; therefore there was some degree of consanguinity between the parents of the albino V. 5. II. 2, II. 7, and III. 1 were only children. No deformities or degeneracies known on father's side; no enquiry as to mother's side. (C. H. Usher, 1907.)

Fig. 334. III. 2. Isireli Navunene of Togovere, village on N. coast of main island Viti Levu of Fiji; a marked albino, aged about 40, was seen by C. H. Usher and gave the information. See Plate U. Skin fair but darker than Mr Usher's, very much freckled on back and front of chest and extensor surfaces of entire upper extremities and thighs; hardly any on flexor surfaces or on dorsum of foot; some freckles run together into large patches, but even here the individual spots can be distinguished, the junctions being lighter than the body of the spots; hair, lashes and brows light yellow; iris blue-gray with yellow spots at the corona; constant lateral nystagmus; fundus light but not remarkably so. Is moderately intelligent. His parents (II. 1 and 2) both from Togovere but different Matagalis. III. 1, Isireli's albino brother, died when a young man. The village of Togovere is 12 miles from Tavua, both on the coast; but none of Isireli's people came from Tavua nor did any of his female relations marry at Tavua; if this is all true he is no relation of the albino, Samuela Navoce: see Fig. 386. (C. H. Usher, 1907.)

¹ The descent line from IV. 7 to V. 4 has escaped engraver.

Fig. 335. See above after Fig. 328.

PLATE XXXII. Fig. 336. Two albinos in a sibship of ten; European family from Ceylon. II. 3 and 4 albinotic sister and brother, both unmarried. 4 is living. Maternal side (I. 1) is Dutch-Portuguese. No cousin marriages in parents, grandparents or great-grandparents. (Dr Craib and C. H. Usher, 1906—7.)

Fig. 337. Two albino siblings at Menado, Celebes, but the family is of Philippine origin. II. 1 and 2 the only issue of I. 3 and 4; both are albinotic. I. 3 and 4 are normal. I. 3, father of the albinos, has two normal brothers (I. 1 and 2). It is not known whether I. 3 and 4 are cousins, nor whether 4 (mother of the albinos) has any sibs. (Information from a lad on Dutch steamer "Speelman," a native of Menado, who knows the family.) (C. H. Usher, 1907.)

Fig. 338. II. 1. A Javanese-Malay boy, aged about ten, when seen by C. H. Usher at Bandong Railway Station, Java, in March, 1907. Nystagmus, pupils red, photophobia; seemed intelligent; hair white; skin blond but with several round brown spots on brow as large as a threepenny piece and a few smaller ones on chest—none on back. "The appearance does not suggest a piebald condition." He has brothers and sisters but he is the only albino. I. 1, the father, said to have been white when young, also some of his relations, but became dark when grown up. N.B. The Javanese are not very dark skinned though they have quite black hair. C. H. U. (The family history obtained through the Hotelman at Bandong Station. C. H. Usher, 1907.)

Fig. 339. Mr Heinrods, formerly U.S. Vice-Consul in Samoa, has seen an albinotic brother and sister there whose parents were normal; no other details. (C. H. Usher, 1907.)

Fig. 340. At Napier, New Zealand, some years (?20) ago there were according to the informant (a cousin of Mr Warbeck who is a guide at Rotorna, now (1907) aged about 50, and knows the Maori country of the North island well) two albinos in a family of several siblings, with dark parents. They went to school at Napier. (C. H. Usher, 1907.)

Fig. 341. "Soon after my arrival in London I saw a remarkable circumstance relative to African complexion, which I thought so extraordinary, that I beg leave just to mention it: a white negro woman, that I had formerly seen in London and other parts had married a white man, by whom she had three boys and they were every one mulattoes and yet they had fine light hair." (*The Interesting Narrative of the Life of Olaudah Equiano.....by himself.* 1st Ed., p. 217, 1789, repeated unchanged in 3rd, 6th, 7th, and 8th editions. The account of Equiano's life by himself, bears on the face of it credentials for the veracity and powers of observation of this early negro writer.)

Fig. 342. "Several canoes with the natives of Depeyster's Group or Island [Ellice Islands north of Fiji] came to the ship....In many the skin was disfigured by some disease—in some it appeared as if scurf prevailed—in others the scurf had disappeared and left the skin marked with circular and wavy lines. About a fifth were affected in this fashion and the skin of these was much lighter than in any Polynesian race they had met with. Among the natives were two albinos; the colour of their skin was reddish white, the hair of a flaxen white, with light blue eyes, so weak as to oblige them to use a shade and to keep their eyes constantly half closed. Their persons also seemed to be tender, and they avoided exposure to the sun by an additional mat over the shoulders. They were covered in many places with large brown freckles; their whole appearance was anything but pleasing. The account they gave of themselves was, that their parents were the same as the rest of the islanders and that their other children were dark." (*U.S. Exploring Expedition*, Vol. v., p. 41, 1838—42.)

Fig. 343. "The Dyaks brought down with them an albino, a monstrosity which is not rare in their country [Borneo]. He was a miserable looking wretch; his skin, of an unhealthy white, was almost concealed with great blotches of sun freckle, his hair was of no known colour; his eyes were of a pale gray but he was quite unable to raise them from the ground in consequence of the sun glare of the river; he told us in fact that he never could look up for more than a glance when the sun was above the horizon. However, he was unmistakeably a white man and the Dyaks rejoiced in him accordingly. We were told that the parents of this specimen were both of the national colour, but that all his brothers and sisters were albinos and also that several of his ancestors had shown the same peculiarity. (Boyle, *Adventures among the Dyaks*, London, 1865, pp. 95—6.)

Fig. 344. Three Chinese albinos in same pedigree at Samarinda, a Dutch town on east coast of Borneo. I. 1 and 2 not albinotic; not known whether they were consanguineous. II. 3 and 4 albinotic brother and sister (order of birth uncertain); the brother (II. 3) married and had an albino child (III. 3). The two normal brothers (II. 1 and 2) had all normal children. (Information from officers of Dutch Steamer "Speelman" who have been out there seven years. March, 1907. C. H. Usher.)

Fig. 345. Incomplete albinism. Daru Island, British New Guinea. III. 2, a male child aged $2\frac{1}{2}$ years, named Kanai, seen by C. H. Usher. Hair of head and eyelashes light brown, body-hair white; skin brown all over and not patchy but much lighter than his parents (II. 2 and 3) who are very dark; irides light brown; constant lateral nystagmus; marked photophobia; no ophthalmoscopic examination. II. 1, Sanau female, aged 25, said to be a sister (or ?cousin) of Kanai's mother, and called an albino, was seen. Skin brown but much lighter than rest of her tribe and was formerly lighter and pupils said to have been red. Specimen of hair kept, it is quite brown. Choroid light; refraction H., no nystagmus. Her child (III. 1) is dark. II. 3, Pedi, father of Kanai, seen, quite dark. Pedi's father (I. 1) (dead) said by Pedi to have had 'moving eyes,' i.e. nystagmus, when young but it passed off; neither his skin nor hair was light. (C. H. Usher, 1907.)

Fig. 346. Near Osaka, Japan. The two male albinos (III. 1 and 2) are the only albinos known in the family; parents (II. 2 and 3) not cousins and neither they nor grandparents (I.) albinotic. See Plate R. (Dr Ito, Ophthalmic Surgeon, Kyoto, and C. H. Usher, May, 1907.)

Fig. 347. British New Guinea. II. 1, Walloulou¹, village of Bulla, close to Kerapuna; a middle aged man seen and photographed by C. H. U. June, 1907. See Plate X. Skin fair but with numerous brown spots, round or irregularly rounded from half an inch or less to an inch and a quarter diameter; they are chiefly on trunk, extensor surfaces of arms, face, and to a certain extent on legs; no ulceration but many scars in the spotted region; the spots were not present at birth but came on in childhood. Eyes, constant lateral nystagmus, and on L. side internal squint; iris gray; choroid light and not patchy; refraction myopic; photophobia. Hair yellowish. Parents not consanguineous; no albinos known in previous generations. II. 4, youngest sibling of II. 1, an albino girl who died when she was 20. She had small spots on the skin. (C. H. Usher, June, 1907.)

Fig. 348. Hula, British New Guinea. I. 1 and 2 were both dark. II. 2, Delimilu, aged about 45; hair, lashes and brows light yellow; skin fair "but not so fair as mine" (C. H. U.); pigmented spots on back, and to less extent on front, of trunk, and a few on extensor surfaces of arms; well defined, roughly circular, smooth and not raised, diameter about half an inch, but one or two larger; some ulcers and much scar tissue on various parts of trunk. Eyes, L. shrunken, R. nystagmus, photophobia; iris gray or greenish-brown, choroid light; refraction myopic. See Plate X. He has one child, an albino (III. 1); mother (II. 1) normally brown. (C. H. Usher, 1907.)

Fig. 349. III. 3, Kila Belama, adult male from Hula, British New Guinea; typical albino, unmarried, said to be no relation to albinos of Fig. 348. Hair, brows and lashes light yellow; skin fair but with many dark brown and blackish spots, half to one inch diameter, on back and chest and to less extent on extensor surfaces of arms; they are rounded, not raised, and resemble freckles; face tattooed, no scars elsewhere; the spots "come themselves," and a European said he knew Kila Belama when he had no spots. Eyes, constant lateral nystagmus; no squint; refraction of R. myopic, L. hypermetropic; choroids light, vessels very conspicuous. III. 4, albinotic brother of III. 3. (C. H. Usher, 1907.)

Fig. 350. Two albinos (III. 3 and 4) in a sibship of three. III. 4, female, named Tiriah, aged 20; she has many freckles on face and neck but none elsewhere; skin very white; hair very fair; irides hazel; nystagmus; refraction myopic; fundus not pale but choroidal vessels visible. Has been married for about a year to a normal Chinaman (III. 2); they have no children as yet. The albinotic brother (III. 3) had gone to Singapore and could not be traced. See Plate R.

This family lives at a Kampong in the state of Negri Sembilan only about half a mile from the one where the next Case, Tati, lives; but Tiriah (Case ii) and Tati (Case iii) are not known to be related. (Dr H. Fraser, Malay States, Case ii., 1908.)

Fig. 351. Two albinos (II. 7 and 8) in a sibship of five; II. 7 died when he was 20, leaving two children (III. 5 and 6) who were not albinotic; II. 8, named Tati, living, age given as 40, but Dr Fraser thinks she is not more than 30; married to an ordinary Malay (II. 5), aged 50, from a different part; they have four children (III. 1—4), none of them albinotic. She (II. 8) has freckles on face, neck and dorsum of hands; skin very white; hair golden; irides hazel; marked nystagmus; refraction myopic; choroidal vessels visible but fundus not pale. See Plate R. (Dr H. Fraser, Malay States, Case iii., 1908.)

Fig. 352². A family with complete, partial and changing albinism seen by Michaelis in the Harz at Lerbach in 1798. In a sibship of four there appear to have been two partial and two complete albinos. III. 3, an albino girl aged nine, and III. 4, an albino boy of five years. Skin of girl III. 3 unnatural white; arms, especially on outer side, covered with long, stiff hairs; hair of scalp, very white, fine and almost throughout curly; not big for her age; the pupil wholly red, however the light fell on it; irides red also, only darker and mixed with white streaks; sclerotica appeared whiter and almost transparent. Marked photophobia and (?) rotatory nystagmus (the eyes "drehten sich beständig herum"). The girl was beginning to see better and the redness of the eyes to diminish. III. 4 was very little different, except

¹ The names of persons and some places in New Guinea are necessarily spelt phonetically.

² Inserted rather unfittingly on this plate by engraver to replace a cancelled figure.

that he was albinotic in a higher degree; his skin whiter; his eyes "hellröther" and almost of the clearest rose-red; irides somewhat darker, but lighter than with his sister; his eyes were "reizbarer, lichtscheuer, unruhiger, und das Gesicht schwächer" than in his sister's case. Hair curly, arms less covered with hair; on the cheeks, which were paler than his sister's, here and there were traces of a "schilfrigen Haut." Both albinos had not particularly contracted pupils; they were delicate and had learnt to walk late. According to report the two elder children had earlier the same defects of the eyes as the younger, but they had gradually vanished; the pastor remarked that III. 2, aged 19, still read better in shadow than in a bright light, although the boy himself would not admit it. The albinism appeared to have originated in the maternal grandmother (I. 4) who was reported to have had white hair and a like defect of the eyes. The mother (II. 2), aged about 40, was small and slenderly built, and had for a peasant a very white skin, and wholly white hair; the eyes were "hellblau," and the pupil black. She asserted that she had never had the eye failings of her children, but on other occasions she had represented the contrary. (Hospital medicus, Dr Michaelis, Blumenbach's *Med. Bibliothek*, Bd. III. S. 679, 1798.)

Fig. 353. Four albinos in a sibship of ten (IV. 1 to 10), all but two living; from a Malay Kampong or village some distance from the town of Kuala Kubu in the State of Selangor. Parents (III. 5 and 6) ordinary Malays in apparently good health. The ages of their ten children are: IV. 1 is 18 and the others successively 16, 15, 14, 13 (IV. 5), 5 (IV. 7) 4, and 4 months (IV. 10); IV. 6 died at 2 years and IV. 9 at 1½ years. The albinos IV. 5, aged 13, and IV. 7, aged 5, are normal in other respects, with pronounced photophobia; no ophthalmoscopic examination was possible and no note of colour of irides as they obstinately refused to open their eyes; IV. 5 has red hair, very white skin and a few freckles on face; IV. 7 has "colourless" hair, skin even whiter than IV. 5 and no freckles: IV. 10 has "colourless" hair and extremely white skin. See Plate Q. The albinotic baby (IV. 10), aged four months, has six fingers on each hand and six toes on each foot. It is said that I. 2 was an albino and a first cousin of her husband (I. 8). III. 5 and III. 6 are first cousins. Dr Fraser writes "Malays in their own districts live in Kampongs which are a sort of village; the houses stand each in their own compound which is usually a rice-field, or a cocoanut plantation. Inter-marriage amongst Kampong Malays is, I understand, fairly common; the Kampongs are never large, and the Malay tends to remain domiciled in his or her particular one. The Kampong might be compared to a collection of very small crofts, and apparently all the people on such a Kampong are more or less related." In his notes on Figs. 350 and 351 Dr Fraser says the Kampongs from which they come number respectively 120 houses with about 500 inhabitants and 135 houses with about 550 inhabitants. (Dr H. Fraser, Malay States, Case i, 1908.)

Fig. 354. Albinism in native family of Nukufetau, Ellice Islands. One albino in each of two sibships second cousins to each other. IV. 3, Podini, aged about five, fourth born of six, the first five living; iris for most part green but blue at periphery, the green radiating out from pupillary portion; pupil shows red glare and acts normally to light; nystagmus; photophobia; hair, eyebrows and lashes white; skin below the eyes full and slightly reddened; colour of skin "difficult to say owing to exposure and tinea imbricata" (=roughening of skin from presence of a form of ring-worm). IV. 9, Lamosi, aged about ten, fourth of six, first (who would now be about 16) and third dead; IV. 7 is now 14; IV. 11 is one year old; IV. 9 iris for most part blue, but some yellow rays streak out from pupillary part towards periphery; pupil shows red glare and acts to light; nystagmus; photophobia; hair, eyebrows and lashes white; skin below eyes full as in Podini; skin generally rough from tinea imbricata, a disease that is almost universal. No description of colour of skin in either albino, but the whole context points to its being albinotic. No albinos in III. 2 to 5, and the husbands 1 and 6 were also normal. II. 1 and 5 both normal. II. 2 and 4 two sisters and 3 their siblings, children of a stock represented by I. 1 and 2 in which there is said "always" to have been an albino though no particulars could be obtained; it could

¹ With reference to the question of cousin marriages Dr Fraser has sent us the following information from a gentleman who he states has considerable knowledge of the Malays and their customs:

"The marriage rules sanctioned by local custom absolutely forbid marriage between first cousins on the mother's side, in fact even among members of the same tribe a child, belonging to his mother's tribe, cannot intermarry. Marriages between first and second cousins on the father's side are not explicitly forbidden but are exceedingly rare.

In the whole of Rembau with a Malay population estimated at between 15 and 20 thousand, I have been able to hear of only four authentic cases of marriage between cousins on the father's side. The prejudice against such a marriage is due to the fact that it robs an uncle or father of his functions. On the other hand in the 'royal' families—at least in the family of the Yang di Pertuan of Sri Menanti (Sultan of Negri Sembilan)—cousin marriages are the rule. The interbreeding is exceedingly close.

Mr R. J. Wilkinson, an eminent authority on Malays and their customs, says 'I am inclined to think that cousin marriages are comparatively common among Malays. For instance Raja Rashid, son of the Sultan, married his first cousin last month. I could give a number of other instances from Malay royal pedigrees. In fact this intermarrying makes it difficult to draw up pedigrees of families.'

This statement is true of the Sultans and of the chiefs. I believe it to be true of the people generally in Perak, for Malays keep to their villages and make up marriages with their neighbours.

The Malays of the Negri Sembilan practise exogamy and I should say that cousin-marriages are less common there..... I do not mean, of course, to assert that marriages with first cousins are the custom in Perak. But there is no feeling against them, and they are often convenient for family reasons. The Sultan has married at least four of his children to cousins, and he himself married a cousin; second cousins mostly. Still it shows a certain tendency to endogamy." (Dr H. Fraser, Kuala Lumpur, F.M.S., 28 May, 1908.)

not be ascertained whether or not the sibship II. 2, 3 and 4 contained any albinos. The tradition of albinism in the earlier generations exists in both the albinotic sibships of IV, though these sibships are not considered as being related to each other and their true kinship was only discovered by questioning a very old native man. First cousin marriages discountenanced but not forbidden; no statement as to the husbands of II. 2 and 4 and of III. 2 and 5, except that they were normal in colour. III. 5 was seen and questioned and although certain that none of her siblings were albinotic could not be equally sure as to her uncles and aunts either maternal or paternal.

From Staff-Surgeon F. F. Lobb, R.N., H.M.S. "Pegasus," Australian Station, who made the investigation personally, in September, 1907, at Nukufetau, a small island of the Ellice group containing about 350 natives. The inhabitants are chiefly of Samoan stock, all living in one village, but extraneous blood introduced from time to time by trading vessels. (Forwarded by C. H. Usher.)

Fig. 355. Girl, about nine or ten years old, seen at Malacuny in the Soo-soo country; born of black parents; "her skin was an unpleasant dead-looking white and pretty smooth, though beginning to assume a cracked appearance owing to the action of the sun. There was a man of the same colour belonging to this town, but he was then absent. This state of skin is called by the Soo-soos *fong-foo*, and by the Bulloms and Tunmances *p'oolu*." (Included by Dr T. Winterbottom among instances of white negroes, whom he had seen. *Account of the Native Africans in the Neighbourhood of Sierra Leone*, London, 1803, Vol. II., pp. 166—174.)

Fig. 356. At Bottoe on the Kroo coast, a white negro, 25 years. His parents (I. 1 and 2) both black, but besides several black children (II. 1) they had another albino child (II. 4). *She had married a black man and had two black children.* Her brother was married but had no offspring. "His skin was nearly of a cream colour and freckled from exposure, but so very much unlike that of European sailors who expose themselves without shirts to the sun that the difference was very striking at some distance. His eyes were of a reddish colour and very weak, appearing red round the edges of the tarsi and constantly winking in a strong light. His skin was uncommonly coarse in its texture and the sebaceous glands were large and numerous." (Dr Winterbottom, *loc. cit.*)

Fig. 357. A white negress at Damboya near Waukapong in the Soo-soo country. Her parents and siblings all black. She was married to a black man and had a black child. "Her appearance was extremely disgusting, her skin was remarkably coarse and wrinkled, though she was but a young woman; it was very dry and harsh to the touch and marked with deep furrows. As she was much exposed to the sun, her skin, especially on the back, had somewhat of a reddish tinge or cream colour, but in parts less exposed it was of a dirty white. Large black spots like freckles, produced by the sun, and of the size of a pea were thickly scattered over her skin. Her hair was of a dirty yellowish white, but woolly and crisp. Her eyes were of a light bluish colour, very weak, constantly twinkling. The eyebrows and eyelashes were nearly white. I was informed that a boy of similar appearance resided in the neighbourhood." (Dr T. Winterbottom, *loc. cit.*)

Fig. 358. A brother and sister, aged 25 and 20, both albinos; their hair whitish-brown, eyes blue and skin as white as that of Europeans. (Seen by D'Albertis, *New Guinea*, Vol. I., p. 108, 1880.)

Fig. 359. Three albinos in a sibship of seven, the offspring of two Tives Malayalams from Coula observed at Mahé, Malabar. II. 1, aged 22, II. 2, aged 21, II. 5, aged 7, and II. 6 aged 6 months were normally coloured. There was one stillborn albino child (order of birth?), and two living albinos, II. 3, aged 19, and II. 4, aged 10. II. 3, Gombil Gobaalé, skin very white (No. 24, Broca's Scale) on the covered parts of the body, face and hands exposed to sun red. Hair, straight, brilliant silver white with yellowish tint on top of head, thick and abundant, to touch like stiff hairs of animals. Beard shaved but roots quite white; breast nearly smooth, legs very hairy; body well built, medium intelligence, full anthropometric details. Eyes closed to keep out bright light, nystagmus, myopic; sight tested in a variety of ways; in dusk and almost complete darkness, did not see as well as normals. Iris and pupil of normal dimensions, dilatation very apparent in darkness. Irides seem blue (Broca, *Tab. Chromat.* No. 14), looking closely apparent colour is formed of a blue layer, slightly tinted with gray... "et que les stries blanches assez renflées, allongées zigzaguant et se mélangeant sans ordre, irrégulières dans leurs dimensions, convergent du centre dans une teinte légèrement fondue, un peu plus foncée, vers la périphérie qu'elles n'atteignent pas, de telle sorte qu'on a peine à voir si la couche pigmentée est réellement bleue et si ce ne sont pas les stries qui prennent cette couleur sur un fond blanc. La périphérie, d'ailleurs, se détache nettement de la cornée qui est régulièrement veinée et ne présente aucune particularité." (E. Deschamps, *L'Anthropologie*, 1893, T. IV. pp. 335—8.)

Fig. 360. II. 1, Anna Guanapragassa, aged 43, born at Pondicherry of Tamil parents, the only child. Father's and mother's skin No. 37. Eyelids three-quarters closed, pupils dark red, looking black in shadow. Iris gray with a suspicion of green, and slightly darkened *striae* converging towards periphery, which is blue green mixed with little gray. Does not see better in darkness; the same Tamil book which she read in semi-darkness at 0.30 m. she read at 0.40 in the light; to read she gets near the light. Distinguishes colours perfectly. In full sunlight feels no pain unless rays directly strike eyes. Hair of scalp straight, brilliant white with slight yellowish tinge and abundant; arms rather hairy; eyebrows and

eyelashes not so copious. Skin very white; intelligence well developed, very strong constitution. (Deschamps, *loc. cit.*)

Fig. 361. A Mussulman, I. 1 (skin No. 37—22), married to a woman, I. 2 (skin No. 21—22), had three children. II. 1, female, aged 7, coloured. II. 2, aged 6, an albino, and II. 3, aged $1\frac{3}{4}$, albino, the two latter boys. II. 3, seen, was a perfect albino in tint of skin, colour of hair, etc. Eyes three-quarters closed. Well made and in good health. None of the ancestors on either side were, as far as the recorder could discover, albinos. He was told of another Mussulman albino inhabitant also of Mahé, but he was absent at the time. (Deschamps, *loc. cit.*)

Fig. 362. Kwarinam, II. 2, a Papuan albino, seen by Finsch at Hula in Hood's Bay, New Guinea. A stoutly built strong man of middle size, 30—32 years,—anthropometric characters given. Skin as light as a white, on face No. 23 (Broca); ears, nose, cheeks, breast, arms, shoulders—all visible parts—strongly reddened by sun or sunburnt; lips red like a European's; nipples small and not black. Where sunburnt, skin rough, elsewhere soft. Almost all parts of body sparingly sprinkled with small and large light and dark brown spots. Larger spots are dark brown and sprinkled most thickly along backbone, although largest only measures 6 mm. Spots do not run into one another, but boundaries not well defined ("mehr oder wenig ausgezacht"). Light spots look like freckles and smaller than dark. About 20 spots on backbone, seven on shoulders, etc., but on the whole not numerous. Eyes yellow brown, lively and brilliant, no weakness ("Blödigkeit"), man can see well in sunlight. Hair fine, and in ringlets, "hellblond," tinge of yellow; eyelashes, "hellblond," beard, ditto, where not torn out as are the eyebrows. Arms and legs thickly covered with fine curly wholly "hellblond" down. Pubic hair light brown and curly. Finsch asserts that there was no question of admixture of European blood¹. Father (I. 1), a strong man about 50 (colour, No. 29), black brown hair with lighter ends; eyes dark brown; mother (I. 2) darker than husband (colour, No. 28). Brother of father also dark (between No. 29 and 30). The albino has three dark siblings (II. 3). He is married to a strongly built woman (about No. 29), black smooth hair, dark eyes. Has two children. III. 1, a girl, aged four to five, dark (No. 29—30), lighter on face; hair dark brown, fairer towards ends, in scanty locks; eyes dark, lips pale red. III. 2, a boy, aged two, scarcely lighter than sister, hair colouring similar, but fine and curly, eyes dark. No case of albinism known in family. In same village but in no way connected with Kwarinam lives another albino, with no other case in his family, 28—30 years, similarly but less freckled. Hair, "hellblond," forming a soft cloud. Eyes like the former's, but blind of one; no photophobia with other. (Dr Otto Finsch, *Zeitschrift für Ethnologie*, Bd. xv., S. 205—8, 1883.)

Fig. 363. In the fishing village Alt-Hula belonging to the large village Kerapuno in Hood Bay, inhabited by Hula people, Finsch met with two albinos in a sibship of four; no other cases of albinism known in the families of either of the dark parents. Father (I. 1), a strong man, 35—40 years, skin colour (No. 29, Broca); hair black with brown ends, coarse ringlets, dark eyes. Mother (I. 2), 30—32 years, same skin colour, hair (short cut) black and dark eyes. Of the siblings II. 1, aged 16, very little fairer than parents (colour No. 29—30), II. 2, albino girl, aged nine, slim, pretty girl, reached her mother's shoulder, skin colour No. 23, parts exposed to sun, *i.e.* breast and knees, tinged with red; parts covered by grass petticoat as fair as upper body; sprinkled with freckles; hair fair and smooth; eyes light brown (between Nos. 3 and 4), could see well in daylight. II. 3, a son, aged seven, darker than his father (almost No. 28); hair, in ringlets, dark brown with lighter ends. II. 4, albino boy, aged five, skin colour almost like his sister, but extremely little spotted with dark spots; smooth light flaxen hair; soft white milk hair over whole body; long white eyelashes; lips beautiful red and red on cheeks; eyes light yellowish brown. Squinted with one eye, but could see well. In modern dress II. 2 and 4 except for expression of face, would pass for European children. (Dr Otto Finsch, *loc. cit.*)

PLATE XXXIII. Fig. 364. A family tree showing four complete and five partial albinos. The family is one in which records and portraits are very complete for a number of generations. There are many very fair individuals and the albinotic tendency was strengthened in generation VII. by a marriage of first cousins, following a marriage of second cousins. All the albinos in Gen. VII. are now dead. The twin sisters VII. 24 and 25 suffered from photophobia and nystagmus and the house was kept dark on their account. The sister VII. 27 was a complete albino, and her brother VII. 28 (myopic and weak-sighted) likewise was so, being on occasion mistaken for his contemporary Robert Lowe, afterward Lord Sherbrooke. VII. 29 was markedly fair, suffered from nystagmus, and had pale yellow hair. Of the sibship, VII. 21 died of cancer leaving two children, VIII. 15 and 16, both sallow, the former dark brown hair and very dark "black" eyes died also of cancer at 49, the latter has brown hair and dark brown eyes; VII. 22, fair, florid and gouty and of poor intelligence, *left two sons*, one died at 13 and the other a failure; VII. 23, fine complexion and brown hair, died at 36; VII. 24 and 25, the albino twins, had good mental powers, one good health, the other ailing but lived long; VII. 26 died at 19; VII. 27, albino, very

¹ Finsch says that the hybrid is easily recognised. The natives call these white Papuans *uro-uro*, *i.e.* white, and feel no contempt for them, nor have they any superstition with regard to them. Finsch holds that they belong to the category of albinism; they appear to be cases of albinotic skin and hair with non-albinotic, or only partially albinotic eyes. The case should, perhaps, have been marked on the pedigree sheet by a half-black circle.

good mental powers, died of lung trouble at 36; VII. 28, albino, good mental powers, good health but gouty; VII. 29 moderate mental powers; VII. 30 and 31 died in infancy; VII. 32, fair skin and hair, blue eyes, died of senile phthisis at 65; VII. 33, his wife (dark), belongs to a stock of considerable fecundity, longevity and notable share of brains; of the seven children, VIII. 21 (dark), died as an infant, VIII. 19 suffered from a peculiar arrest of mental development, very robust, but abnormally high palate; his hair was dark and skin dusky; eyes, dark gray, reported to have a "blind spot," he had one child who died at five months. VIII. 17 and 18 good intelligence, the former brown hair and eyes and very gouty, the latter good health, fair and "yellow" eyes; VIII. 20 had very light hair and skin, gray blue eyes, as fair as the child of VIII. 22, whose pure blue eyes, white complexion and extremely fair hair (less pigment than in the case of many complete albinos when microscopically examined) may be recorded as semi-albinism. The father, VIII. 22, has very good health and intelligence, has reddish hair and blue eyes; his wife is dark and there has been no albino in her ancestry known for four generations, a brother of hers, aged 21, is dark, however, with one white lock of hair, there is no consanguinity between either VII. 32 or VIII. 22 and their wives. The mother of the albino sibship, VI. 10, was extremely fair, and comparable with VII. 29 and VIII. 20, one of her brothers VI. 6 has a grandchild of the like degree of fairness, VIII. 14. The eye- and hair-colours of Gen. VI., VII. and VIII. are all known, but cannot be reproduced here; it must suffice to say that the stock is extremely fair with pure blue eyes. There is no evidence of any child having dark hair, except VIII. 21, and when the hair is now given as "dark brown," it is known to have been light,—the darkest being "golden," in childhood. There was no appearance of complete albinism before Gen. VII. VI. 11 had light brown hair and gray eyes; and the siblings of his wife VI. 10, so far as they survived to be known had blue eyes. Information from VIII. 22. (K. Pearson.)

Fig. 365. Norway. Two related sibships, the first of six with three albinos, the second of ten with three albinos. In the case of the first sibship the parents, II. 3 and 8, are non-consanguineous; in the case of the second sibship the parents, II. 6 and 7, are first cousins, a grandparent of the wife, II. 7, being a parent of the husband's mother, I. 4. The mother, II. 8, of the first sibship is the sister of the father, II. 6, of the second sibship. Taking the first sibship, III. 2, aged 38, living albino, snow-white hair, red pupils, gray irides, nystagmus, is married to a light-haired woman, III. 1, has three dark-haired children. III. 3, male, aged 34, dark hair, single; III. 4, female, dark-haired, died at three years; III. 5, male, 29 years, light reddish hair, married, no offspring; III. 6, female albino, 26 years, snow-white hair, nystagmus, gray irides, red pupils. III. 7, died at four months, a female albino. *This was the fourth born and should have been placed between III. 4 and III. 5.* The father, II. 3, died aged 40 of kidney disease, reddish beard, dark brown hair, dark blue eyes. He had two non-albinotic brothers, who have been in America many years and nothing known of their offspring. The paternal grandparents were not related, and were normal. The mother, II. 8, died aged 54, also of kidney disease, fair hair, light blue eyes, suffered many years from asthma. The maternal grandfather I. 3 and grandmother I. 4 were normal and not related. Of the mother's whole siblings (*i.e.* those due to I. 3 the first husband of I. 4), II. 5, male, 65 years old, medium dark hair, blue eyes, has married and has 10 normal children; II. 6, male, 59 years, reddish beard, married with his first cousin, II. 7, on the mother's side (hair and eyes?) has 10 children: namely, III. 9, aged 59, male, fair-haired, blue eyes; III. 10, male, aged 37, albino, snow-white hair, nystagmus, red pupils, very deaf, myopic, mentally defective; III. 11, male, aged 35, nearly black hair; III. 12, three normal children, dead, in childhood, one by accident; III. 13, male, aged 29, albino, snow-white hair, red pupils, gray iris and nystagmus, very little mental power; III. 14, female, aged 24, dark brown hair; III. 15, male albino, aged 23, snow-white hair, red pupils, nystagmus but good sight, intelligent; III. 16, male, aged 18, blond. The mother of this sibship, II. 7, had a half-brother, II. 10, dark hair who died of *paralysis cordis* at 56, he had 12 normal children; also a half-sister, II. 11, living and normal with six dark-haired children. These half brethren were the children of I. 4 by the second husband, I. 5. (Dr Vilhelm Magnus, Christiania, 1908.)

Fig. 366. Norway. In a sibship of six, four albinos. They are: III. 2, male, living, normal, married, normal children (number?); III. 4, male albino, dead, married normal wife and had normal children (number?); III. 6, female albino, living, married, but without issue; III. 7, male albino, living, single; III. 8, female albino, living, single; III. 9, male, living, normal, married, with normal children (number?). The father, II. 7, dark hair and eyes, had *four*¹ normal brothers and three normal sisters; the mother, II. 9, has five normal *brothers*² and one normal sister. This sister, II. 10, married her first cousin, and has one son, an albino male, III. 12, he married a normal wife and has normal children. There is consanguinity in one albino line only. (Dr Pedersen Hjelmeland, R., K. and E. Slaegten, sent by Dr Vilhelm Magnus, 1908.)

Fig. 367. Norway. Neighbourhood of Mandal. Two albinos in a sibship of six. IV. 1, aged eight, albino girl, short sight; IV. 2 and 3 are normal children; IV. 4, aged four, albino boy. Father, III. 1, aged 49, and mother, III. 2, aged 35, normal, but father's mother, II. 2, had two albino first cousins. (Dr Nilsen, Mandal, sent by Dr Vilhelm Magnus, 1908.)

¹ Engraver has dropped one brother.

² Sex omitted in figure.

PLATE XXXIV. Fig. 368. Two albinos in grandchildren of first cousins (Scotland). Prevalence of fair hair and blue eyes on one parental side. V. 6, aged 8, complete albino; normal general development and growth; plays violin; nystagmus (118 per minute), pupils red, iris translucent and ciliary processes seen through it; refraction H., V. only $\frac{5}{60}$; fundus typically albinotic, the yellow spot as usual redder and choroidal vessels not visible there. Hair, eyebrows and lashes quite white; a number of long hairs along the spine. IV. 3, a distant cousin of IV. 12, was an albino; died aged 11 years from a burn. V. 3, eldest sibling of V. 6, died aged 12 years, measles, had blue eyes and fair auburn hair, sight good and pupils not red; V. 4, 5, 8, brown eyes, medium brown hair; V. 7 and 9, miscarriages. IV. 3 had one illegitimate half-sibling (IV. 1) and 7 full siblings (IV. 2 and 4), of whom there are no details. IV. 5 to 11, other first cousins of the albinos, V. 5 fair, V. 6 blue eyes and dark hair, V. 7 to 11, no details. In III, the parents 1 and 2 were fair; IV. 12, auburn hair, dark eyes. II. 5, a grandmother of the albinos, had very fair hair and fair blue eyes but good sight, and her sister, II. 7, was the same; II. 6, reddish hair; II. 2, husband and first cousin (?how) of II. 5, was dark as was his father (I. 2). II. 4, illegitimate half-sister of II. 5, auburn hair, dark eyes; she was paternal grandmother of IV. 12. (C. H. Usher, October 1907.)

Fig. 369. Five albinos in a large pedigree of white people living at Suva, Fiji; three of them the issue of a second marriage which began with three miscarriages. There is no consanguinity anywhere. Nearly all the normal members, even the siblings of albinos, dark; only the albinos' mother and some nieces noted as fair. IV. 15, albino woman, aged 24 (1907), single, intelligent and sensible; skin very fair, no freckles though living in Fiji and keeping forearms uncovered; hair, brows and lashes light yellow; photophobia; irides gray, pupils red; lateral nystagmus; fundus albinotic; refraction H., and she wears strong convex spectacles constantly. IV. 10, male albino, who died about 1904, aged 30, of some "gastric" trouble; he was not married but had an illegitimate son (V. 7) who is an albino; the mother of V. 7 was dark. IV. 11 was born dead and the doctor said it was an albino. IV. 12, 13, 14 are all dark or very dark (photographs seen); IV. 16, has brown hair and light eyes. IV. 9, three consecutive miscarriages. Mother (III. 9), an Australian born, now (1907) aged at least 60, blue eyes and rather light brown hair; married twice; by first husband, a dark Scotchman (III. 2), six children (IV. 3 to 8), none light, eldest is aged 44; the second husband (III. 15)—who is not a cousin, has dark hair, now gray and has never heard of albinos in his relations, who are all dark—the ten births of this family are dealt with above, the youngest child (IV. 16) now aged about 22 (1907). III. 5—12, nine siblings, of whom III. 9 is the albinos' mother, III. 6 is a sister of whose eight children two were very fair, but not albinos; III. 10 and 11, twins, 10 being alive with brown hair, 11 dead; III. 12 also dead. The albinism seems to have come from II. 7, the maternal grandmother of the albinos; she was like IV. 15 with very light yellow hair that turned silvery in old age, but some of this hair kept in a locket became yellow again; her eyes were very light coloured and she used to screw up her eyelids and shade her eyes with her hands; she died aged 65; her husband, not a cousin, was dark as were his three siblings; he was not the eldest or youngest. No details of II. 8 and 9, nor of Gen. I. except the names. II. 10 and 11 not cousins. The second family (IV. 9—16) and their parents live at Suva, the capital, and were seen by me in 1907. The information was chiefly given by III. 9. (C. H. Usher, 1907.)

Fig. 370. The patient (III. 3), aged 27, a not quite complete albino, has very light golden hair, irides of palest blue but not translucent; fundus albinotic; nystagmus, V. only $\frac{6}{60}$ and not improved by correction of the high My. As. She is first born of ten, six living; the fourth (III. 4) has hair and eyes like III. 3; the others (III. 5) dark. Parents first cousins; mother (II. 3) dark; but her eldest sister (II. 1) was very fair as a child, becoming darker, she has good eyes. Father (II. 4) was very fair as a child; his only brother (II. 5) dark. None of the cousins (III. 1, 2 and 7) have defective eyes. (Mr Leslie Paton, *Trans. Ophth. Soc.*, xxvii., 219, 1907.)

Fig. 371. One albino in sibship of seven; the three older very dark, the three younger very fair and all six with good sight. The albino (III. 2) aged five is typical, with nystagmus and very poor sight; Refraction My. 6 D. in each, with 1 D. of As. in R. Mother (II. 2) and all the family on her side, so far as known, dark. Father (II. 3) and his father (I. 4) both very dark, but I. 3 (father's mother) and I. 5 (brother of father's father) both very fair. No consanguinity. (Mr E. Erskine Henderson, Sept. 1907.)

Fig. 372. Two complete albinos out of eleven, one of the albinos a twin, the other twin not albinotic. III. 1, aged 16, complete albino, well-grown and healthy, menstruating regularly for two years; hair abundant, silky and all but white. III. 2, male albino twin who died aged six months, "was quite white and had pinkish eyes"; III. 3, the other twin, living aged six years was born with dark hair and now has dark brown hair and brown eyes. III. 4, eight other children three of whom are living and all more or less dark; five died under one year old of various illnesses. Mother (II. 3) brown hair, hazel eyes. Father (II. 2) brown hair and blue eyes. Of the four grandparents one was very dark the other three brown haired. (Mr Bishop Harman.)

Fig. 373. Four¹ albinos in a sibship of 12. II. 4 to 9 are intelligent above average, athletic, cycling

¹ The draughtsman has omitted to black II. 12.

and riding. Father (I. 5) and mother (I. 4) robust and healthy. The mother and her two known married brothers are dark, there are no albinos in the offspring of I. 2 and 3. The father had eight brothers and sisters, of whom five were married (beside I. 5), and as far as the informant (II. 9) knows there are no albinos in the offspring. Of the albinotic sibship itself, the albinos were born as placed as the second, sixth, seventh and eleventh children of the marriage; but the individual order of others was not recorded. II. 3 has dark hair (as also II. 5 and 6, 10 one of 11 and 13); II. 7, and the other of 11, 11, have "golden hair" (?rufous). Three non-albinotic brothers are married and of the offspring at present III. 1 has dark hair, III. 2 and 3, "golden hair," and the latter of fair (presumably markedly fair) complexion. The dark haired siblings have dark blue eyes, and the golden haired light blue eyes. The father came from County Down, and the mother from County Derry, Ireland, and the family has emigrated to New Zealand. The dark hair and blue eyes suggest the Celtic type, breaking down into the rufous and completely albinotic. No consanguinity known anywhere. (Dr G. M. Scott, Wellington, N.Z.)

Fig. 374. II. 1 is Mansfeld's case, which led to his theory of albinism; the pedigree has been completed by Prof. Uhde. The sibship consists of six, of whom three are albinotic. II. 2, black-brown hair, blue irides and black pupils, II. 3, brown hair, dark irides and black pupils, and II. 5, brownish hair, dark irides and black pupils are normal. The three albinos have white hair, "hellblaue" irides and red pupils. I. 2, had three epileptic fits in the first four weeks of the pregnancy of II. 1 (Mansfeld, *Archiv für mediz. Erfahrung*, Bd. 2, 1822, S. 378). Uhde gives no account of II. 1, nor any further details except to say that the name of the family was Rettberg, and that it had lived at Braunschweig since 1820. (Prof. C. W. F. Uhde, *Archiv für Ophthalmologie*, Bd. 2, Abth. 1., Berlin, 1855, S. 308.)

Fig. 375. An incomplete albino, Fritz Müller, aged 17, from Braunschweig, who has a pair of normal siblings, the parents having dark hair and eyes. Skin colour is yellowish, and hair brownish; iris "braungrau" and his pupils wholly red. The eyes gleam in the dusk ("leuchten im Halbdunkel") and possess "etwas Funkelndes." Reads about (what appears from sample given) four or five J. at $\frac{3}{4}$ foot distance. There is a plate (Tafel II. Fig. 1) representing this albino and described as "Albino mit braunen Haaren und leuchternder Pupille." A verbal description, considering the nature of the colour printing of that date, will hardly convey more than the above statements. (Prof. C. W. F. Uhde, *loc. cit.*, S. 308.)

Fig. 376. I. 1, a Jew with raven black hair, and II. 2, a Jewish brunette (dark brown eyes and chestnut brown hair), have four children, all living. II. 1, aged 19, is the albino, II. 2 and 3 are dark, and II. 4, a "genuine blond" (?unusual for such parentage). Albinism denied in both parent stocks, which are not related. Maternal impression (nature not stated) alleged as cause of albinism in II. 1. Parents healthy. II. 1 was born five years after marriage, pregnancy and labour natural; she weighed hardly $4\frac{1}{2}$ lbs. at birth, and till nine years was undergrown, otherwise bodily and mental development normal. Skin from earliest childhood slow in healing; catamenia began at 14 and have been regular, middle stature, well formed figure. Skin, thin delicate rosy, transparent; hair of head, luxuriant and long, and only on temples slightly golden, eyebrows and lashes quite white. Horizontal nystagmus; photophobia not very marked, but needs blue glasses for snow in winter, and greatly dislikes red and bright yellow; colour sense quite complete. Sclerotic translucent, media clear, irides "wasserhell," with a slight gray stroke (Stich) in certain sectors; iris tissue thin and translucent; pupils normal size and action, but not quite round and some small triangular dentations. V. each $\frac{1}{50} \varpi + \frac{1}{18} s \subset -\frac{1}{36}$ cyl. No binocular vision. Visual fields normal but difficult to measure. Only anomaly in the fundus is the entire want of pigment, so that the choroidal vessels can be followed to their finest branches and that the situation of the yellow spot can be recognised only by a slight thickening, not by any alteration of colour. (M. Landesberg, *Klinische Monatsblätter für Augenheilkunde*, Bd. xxiv., S. 399—411, Stuttgart, 1886.)

Fig. 377. A 19-year old albino had four elder siblings of whom the first was albinotic and four younger siblings, of whom II. 5, the seventh in the sibship, was also albinotic. No consanguinity of parents; further details wanting. Locns ?Alsace. (Dr Laqueur, *Zeitschrift für Augenheilkunde*, Bd. x., S. 481—2, 1903.)

Fig. 378. The father and mother I. 1 and 2 were uncle and niece, both were normally pigmented; of four offspring, the second and third were healthy, but the first, II. 1, was albinotic, and the fourth, II. 4, suffered from *retinitis pigmentosa*. (Laqueur, *Zeitschrift für prakt. Aerzte*, No. 31, 1897, S. 728.)

Fig. 379. Two first consins had three children, II. 1 was a complete albino, and suffered from *pes varus*; II. 2, also a complete albino, had congenital simple weakness of one leg ("eine angeborenen, einfachen Schwäche des einen Beines"). III. 3, although not albinotic, was in a high degree myopic; all three offspring were intellectually perfectly normally developed. (Drs Schieb and Bach, cited by Adrian, *loc. cit. sup.*, Fig. 377, S. 5.)

Fig. 380. A Pole married a German in Warsaw, and had an albino son; no record as to other offspring. (Bory de Saint-Vincent, *Essai zoologique sur le genre humain*, 2^e Ed., Paris, 1827, T. II., p. 143.)

Fig. 381. One "absolutely typical albino" in sibship of three. Father's side fair for three generations back. IV. 1, aged $5\frac{9}{12}$; hair very light straw colour, was snow-white at birth, skin "ashy," no pigment in choroid or iris; lateral nystagmus; refraction My. 4.5 D. vertical, em. horizontal. IV. 2, died at seven months, diarrhoea; sandy hair, blue eyes. IV. 3, aged $8\frac{8}{12}$, blue eyes, light brown hair, normally pigmented choroid. Mother (III. 3), dark hair and eyes, had three brothers and five sisters, some fair haired, but eye-colour not known; her mother (II. 1) dark, and knows of no albinos in the family; her father (II. 2) fair. Father (III. 4) sandy hair, blue eyes, good sight, has two brothers (III. 5) one fair, one dark; his mother (II. 4) fair hair, blue eyes; his father (II. 3) sandy hair, blue eyes and paternal grandfather (I. 1) fair. No consanguinity. (Dr Gray Clegg, September, 1907.)

Fig. 382. A single albino in a considerable pedigree. III. 6, Elizabeth, $13\frac{1}{2}$ (January, 1908), well-grown, intelligent, and has done well at school. Menstruation has not begun. Hair yellow-flaxen, eyebrows and lashes white; pupils show red reflex; irides greenish blue, the colour being due to yellow pigment in irregular patches chiefly on the pupillary zone where it forms an incomplete circle; fundus quite albinotic, yellow-spot region rosy as usual in albinos; nystagmus, V. $\frac{6}{60}$; refraction My. As. R. 2 D. vertical, L. 3 D. vertical. At birth hair was so white as to be hardly visible. She is fifth born of nine, all living and no other conceptions. One of III. 5 has blue eyes; none of the others are fair, most having brown or grayish eyes; all have good sight and none wear glasses. Mother (II. 5) married at 19, now about 45, blue eyes, hair dark brown and always has been so. She had a fright (sudden death of a brother) when seven months pregnant with the albino III. 6; she is fourth born of eight; the fifth died at four months old, and the sixth was killed at 24; the other six (including herself) living and aged from 53 to 37; II. 2, 7 and 8 have children, II. 3 and 4, both married, have no issue. Mother's mother (I. 1) was of medium complexion and was fourth born of six; her siblings had only a few children. Mother's father (I. 2) darker; was one of four; his three siblings left few if any issue. Father (II. 9), aged 50, is eldest of four all living; he is dark; II. 11 is the lightest of the four and she is not very fair; she and II. 10, unmarried. No consanguinity anywhere. (Mr Parsons, January, 1908.)

Fig. 383. Two complete albinos in a small pedigree. III. 1, aged $7\frac{1}{2}$, seen by Mr Henderson at Westminster Ophthalmic Hospital, May, 1908; hair white now and was exactly the same at birth; pupils red; nystagmus; refraction H. As. 2.5 D. axes nearly horizontal, V. corrected $\frac{6}{60}$. III. 2, aged 4, only sibling, brown hair and eyes now and since birth. II. 2 complete albino, unmarried, paternal uncle of III. 1, is first born of six. Mother of III. 1 (II. 1) dark, married at 22; father (II. 3) second born, married at 26, brown hair, gray eyes. II. 4 to 7, four sisters in order of birth; all are dark; only one is married and she has only one child (III. 3) with golden hair like his father's brother. Grandmother (I. 1) dark eyes, nearly black hair; grandfather (I. 2) gray eyes, brown hair. (Mr E. Erskine Henderson, May, 1908.)

Fig. 384. A single albino, eldest born in a sibship of five. Of his siblings, II. 3, 4, 5 are medium fair; *there is a very dark sister omitted in the pedigree between II. 4 and II. 5.* The parents I. 1 and I. 2 are dark and the albino has married a dark brown wife, by whom he had three dark brown children who died in infancy. The father (I. 1) was Lancashire and the mother (I. 2) Irish. No other albinos known in either stock. II. 2, aged 64, is intelligent, the only survivor of his family. Hair white and very abundant on body. Irises, pink; lateral nystagmus. Refraction H., degree unknown, V. $\frac{6}{24}$; Jaeger No. 3 with present (self-chosen) $+4\frac{1}{2}$ D. glasses. Now an inmate of an infirmary. (Dr F. Culpin, April, 1908.)

PLATE XXXV. Fig. 385. Two albinos in an extensive pedigree from Batiki island, Fiji. VII. 1, Siteri, girl aged about 12 when seen in 1907. Skin very fair, with many freckles on face, back, extensor surfaces of arms, and a few on chest; hair curly and yellow-brown; lashes and brows light yellow-brown; constant lateral nystagmus; iris blue; refraction My. in both eyes; choroidal vessels distinctly seen but fundus not so light as in most British albinos; is intelligent and healthy. See Plate T. VI. 10 an albino male, age not stated, living on Bau island (1907); he is youngest of four children by a Bau chief (V. 16), and one of his four wives (V. 7); he was not seen; his sister (VI. 9) has six children (VII. 9) said to be very fair "like half-castes" (no particulars given as to their father). The parents (VI. 1 and 24) of Siteri (VII. 1) both from Yavu village but different Matagali; it is said that an ancestor of VI. 24 some generations before, was an albino. I. 2 and the albino VI. 10, both from same Matagali in Bau¹. The following were from Bau: I. 2 and 3 but of different Matagali; II. 2 and 3; III. 5 and 6 but different Matagali, and 7; V. 16 and his first wife (IV. 10). From Yavu village on Batiki island III. 1, 2; IV. 1, 5 and 6 (an only child); V. 2, 14; VI. 1. From Suva III. 3; IV. 7; V. 19. From Rewa (near Suva) II. 1 and 4. Thus a considerable number are known to have come from either the S.E. corner of Viti Levu, including the islet of Bau, or from the island of Batiki about 30 miles to the east. The descendants of II. 3 and 4, to the number of 26, traced to Gen. VIII. and no albinism found. (C. H. Usher, 1907.)

¹ Bau is actually a district in the Province of Tailevu, which includes the very small island of the same name close to coast of S.E. angle of Viti Levu, which is therefore near to Noce, Drekena, Suva, and Rewa.

Fig. 386. Pedigree of Samuela Navoce ("The Pond albino") from village of Tavua (Viti Levu, Fiji), 12 miles from Togovere (case of Fig. 334). IV. 1, Samuela Navoce, aged about 30, shy and perhaps stupid, but bodily development and strength good; married, no children. See Plate U. Skin light though darker than mine, much freckled, flexor surfaces least so; some freckles are confluent as in Isireli Navunene, III. 2 of Fig. 334; hair, brows, lashes and moustache light yellow; iris blue; nystagmus; refraction, R. mixed As., L. Hy.; fundi pale and choroidal vessels well seen. It is thought, but cannot be proved, that the paternal grandfathers of III. 1 and 6 (*i.e.* I. 2 and 3) were brothers, and that the third albino (II. 6) was therefore a first cousin twice removed of IV. 1. Father (III. 1) of albinos IV. 1 and 2 seen; normally pigmented, mentally dull; his second albino child (IV. 2) died when four weeks old; the next three (IV. 3, 4, 5) died very young; IV. 6 married, no issue.

Most of the people at this village (Tavua) seemed stupid. Of the members of the pedigree the following were from Tavua, but in every case the husband and wife are said to have been of different Matagali: I. 1, 3, 4, 5, 6; II. 1, 3, 6, 8; III. 1 and 3. (C. H. Usher, 1907.)

Fig. 387. Two albinos in a small pedigree from Vanuakula on the Rewa river 25 miles up from Nausori in the S.E. part of Viti Levu island, Fiji. The albinos are first cousins by their mothers; II. 2, Ilaia, was a very fat child, aged two months, when seen in 1907. The other (II. 1) died. (C. H. Usher, 1907.)

Fig. 388. An albino in a considerable pedigree, from Ono, a small island close to E. end of the large island of Kadavu, Fiji, which supplied Figs. 326—8 and 335. IV. 5, albino boy, Misikingi, aged about eight, skin very light all over (stripped), no freckles (wears clothes and a hat with a brim close down on head); hair light brown; iris blue; constant lateral nystagmus; refraction mixed As. in both; fundus pale especially at anterior part. Is at school at Suva. (See Plate S.) Mother, a very sensible woman, from whom the information was got, has a decidedly light skin and light brown irides; her corneae are nebulous from old disease and fundus cannot be seen; of her other conceptions, IV. 2 aborted, 3 and 4 were still-born; has often heard the old men discuss the subject of albinism and none could recollect any albinos in the stock. Distribution: at Vabea (Ono), I. 1 and 5, II. 2 and 6, III. 2 and 4 of same Matagali.—II. 3 from Kadavu Island. II. 7, from Tavuki (on Kadavu Island). (C. H. Usher, 1907.)

Fig. 389. Albinos from Ovalau island, Fiji. There are no albinos now alive on this island. The following is from information due to a very intelligent native chief (Veleti, II. 1) now aged about 70 (1907), whose memory, tested in various ways, appeared retentive and trustworthy. III. 5 was an albino named Bulainamotu who died when 18; the old chief Veleti (II. 1) knew him. His two siblings (sisters) III. 4 and 6, had no issue. It is certain that the albino (III. 5) was related to II. 1 and used to call him (II. 1) uncle; it is probable, but cannot be proved, that I. 1 (father of II. 1) and I. 3 (grandfather of III. 5) were brothers. Veleti (II. 1) has always heard that I. 3, who was an albino, married an albino (I. 4); I. 3 and 4 were certainly of the same Matagali at Vuma. II. 6 and 10 were first cousins, but exactly how is unknown as there is no information about the husband of I. 5. II. 4 has a son (III. 2) aged about 40, seen by me; he is not light-skinned; he has no children; II. 5 and 7 each had a child that died; II. 8 had a son (III. 8^a) with deformity of the left foot; his son (IV. 1) was normal but had two sons of whom the younger (V. 2) had a deformed left foot. The two siblings (III. 4 and 6) of the albino had no issue. Veleti (II. 1) had a brother and sister neither of whom had issue; he himself has had four children (by three wives), all died young and none albinos. II. 12 and 13 were cousins and both from Vuma; they were related in some degree to the albino III. 5, but exactly how is unknown; their daughter (III. 11) herself normal, married a normal man (III. 10) from another village and they have a son (IV. 3) aged six with *talipes equino-varus*; this child and the albino (III. 5) are related on the mother's side. (C. H. Usher, 1907.)

Fig. 390. Rusiate Sen or Rusiate Togotogorua from village of Vunisinu, Rewa, S.E. angle of Viti Levu, the main island. III. 4, Rusiate Sen, male albino, aged about 15 (1907) (wears clothes); skin fair, freckles on face, chest and back, and a few on extensor surfaces of arms; none on legs; few are more than half an inch in diameter; upper lip and contiguous part of nose scarred by old ulcerating yaws; hair very light, slightly tinged with yellow; lashes quite white; photophobia and tends to keep R. eye closed; constant lateral nystagmus; iris light blue; fundus markedly albinotic; refraction H. in both eyes. Average intelligence; height below average. See Plate S. He is the third of nine, of whom two others (Nos. 2 and 6) both now dead, were albinos. Parents normal aboriginal Fijians both living and known to Dr Corney; mother (II. 2) belonged to the same "tribe" (? Matagali) as father's mother (I. 3) so that there was some degree of consanguinity between the parents (II. 2 and 3) of the albinos. No information about I. 1 and 4. (The Hon. B. Glanville Corney, M.D., Chief Medical Officer of Fiji, Suva (1906), and C. H. Usher (1907).)

PLATE XXXVI. Fig. 391. Two completely albinotic sisters in a sibship of seven, and two others from different branches. IV. 15, aged 20 (1908), unmarried, well-grown and nourished, healthy, exceptionally good ability, catamenia began at 14 and regular; hair, brows and lashes quite white, skin fair, no freckles or sunburn (July); constant lateral nystagmus 120 a minute; pupils red, equal, contract to light and convergence;

iris gray, translucent and looks red when seen by light reflected from fundus; movements of eyes full; the Meibomian glands very conspicuous as dark red parallel lines on inner surface of lower lids; refraction slight mixed As. in both; R. V. $\frac{6}{30}$, has +0.5 D. cyl. and with it V. $\frac{6}{24}$, L. $\frac{6}{30}$ and with it +0.5 D. cyl. $\frac{6}{30}$; no squint; colour vision normal; fundus very albinotic; has involuntary lateral movements of head and is conscious of them, they are "worse after bright light." IV. 16, aged 19, unmarried, fairly well-grown, but was more difficult to rear than IV. 15 and still tires more easily than others; catamenia regular since 14; intelligence quicker than any of her siblings; colour of hair, brows, lashes, irides, pupils and fundus exactly the same as in IV. 15 and Meibomian glands equally conspicuous; movements of eyes full, but some divergent squint; refraction mixed As., My. vertical, H. horizontal, V. with her glasses, H. $\frac{5}{80}$ with each eye; colour vision normal; fine, rhythmical, but not constant, lateral head-movements. IV. 12, two miscarriages; IV. 13, two sisters, blue eyes, brown hair; IV. 14, eyes light blue, steady and sees well, hair light yellow, his child (V. 3), light blue eyes, fair hair, "not an albino." Mother (III. 11), aged 52, dark hair, blue eyes, healthy, but not very strong, married at 23; the albinos born at full time, she was worried before birth of IV. 15, but not out of health with either of them. Father (III. 9), 57, yellow-brown hair, light blue eyes. I. 2 and II. 5 said to have been albinos; the latter was cousin of II. 6, and had same name, their fathers (I. 3 and 4) probably brothers. Hair- and eye-colour of others: black hair only one known (I. 6); fair hair and blue eyes 12, brown hair of shades and blue eyes another 12, *i.e.* quite 24 with blue eyes; brown eyes and brown or red hair only seven or eight, viz. II. 7, 8, 9, 14, 15, IV. 18 and one of the two, V. 1 and 2. (C. H. Usher.)

Fig. 392. Two albinos, IV. 8 and 9, in a large sibship. Of the siblings, eight were stillborn, one died in 15 days (of these nine no record of albinism has been preserved), one is an imbecile, leaving three normals and the two albinos. IV. 3, aged 30, dark brown hair and eyes with dark skin is married and has three children, two dark and one fair, all healthy; IV. 5, aged 29, the imbecile, is dark; IV. 6 was fair but died of hydrophobia from dog bite; IV. 10, aged 10, is fair and quite healthy. As to the albinos, the son IV. 8, aged 25, is a loose shambling youth, white hair, eyebrows and lashes, pink pupils, reflex through pale blue iris, nystagmus, defective sight, but reads much; intelligent, excellent memory, no illness and good worker, excellent hearing; IV. 9, aged 21, well-grown and developed, has had no illness, but a weak throat, and has lost 20 teeth, partly for regulation and partly for decay; hair fine, like spun glass, white with slight yellow tinge, good length and quantity; eyebrows and lashes white; body hair everywhere white; no mole or pigmentation of any kind, not on areola of nipple; irides very pale gray, pupils and reflex through iris red to fiery; nystagmus, eyes weak, conjunctivitis, but reads well; excellent memory, no deafness or any other defect of mind or body. The father, III. 7, said to be strong and well, fair complexion, he and his four living brothers are all described as "ginger." One brother, III. 3, and one sister, III. 2, have died of tuberculosis. The paternal grandparents, II. 1 and 2, were fair, and the brother, II. 3, of the paternal grandfather had blue eyes and brown hair. I. 2 is also described as fair and hair as "ginger." His sister, I. 4, who was fair, married into a dark family, and had five children, one fair son, II. 6, and four dark daughters. The fair son, II. 6, married a very dark woman, II. 5, and had offspring, III. 8, the mother of the albinos, a woman of good physique (now aged 62, hair now gray, but originally dark, eyes dark gray-brown, skin clear and ruddy), and two sons III. 9 and 10 both dark also. The albinos are thus the outcome of a second cousin marriage between a member of a rufous family and one of a dark family with possibly lightish eyes. No family defect admitted in either family and although many stillbirths no history or evidence of syphilis. (Dr Colgate, August, 1905.)

Fig. 393. A single case of partial albinism now limited to choroid and retina, but with history of white hair in early life. IV. 20, aged 27 (1908), fifth born of six, unmarried; skin fair and florid; hair, brows and lashes light brown, hair was quite white when a child; irides at a general glance look hazel or even brown, but close inspection shows marked yellow-brown pigmentation of the pupillary zone and at periphery slaty-blue colour with some brown spots; transillumination of sclerotic causes bright red reflex through pupil but no red light appeared through any part of iris, proving that posterior surface of iris is well pigmented; choroid exceedingly deficient in pigment and its vessels very conspicuous, although there is a myopic crescent in both eyes and considerable myopia, the yellow spot region of the choroid is the darkest part; constant lateral nystagmus which has been present all her life; refraction in 1897 (aged 16) after use of a mydriatic, R. My. 8 D. vertical, 7 D. horizontal, L. My. 12 D. and 11 D., V. corrected not $\frac{6}{30}$, and she was ordered at that time R. -7 D., L. -11 D. by Dr Mackenzie Davidson who recorded the nystagmus and told her she was "too fair"; she still uses the same spectacles and says she sees better than she did when they were ordered 11 years ago. I may add that from the colour of hair and skin I would not have suspected albinism but I had no doubt of it as soon as I examined the fundus. Of her five siblings, IV. 16 and 17 dark, and their children (V. 10 to 15) also dark except V. 13 who is fair but has good eyes; IV. 18, aged 30, has suffered for six years from Jacksonian epilepsy, the cause of which had not been discovered at date of record, colour of hair and skin same as IV. 20, iris gray, fundus moderately light, her two children (V. 16 and 17) moderately fair with steady blue eyes; IV. 19, fair hair, blue eyes, married, one child (V. 18), auburn hair, blue eyes, good sight; IV. 21, fair hair, blue eyes. Mother (III. 10) quite black hair, brown eyes, her mother (II. 5) dark brown hair, her father (II. 4) dark

hair and lived to 68; of her three siblings, III. 8 and 11, brown eyes, black and light brown hair respectively; 9, blue eyes, brown hair. Father (III. 1), light brown hair, blue eyes, died of phthisis at 47, his mother (II. 3) brown hair and eyes, his father (II. 1) dark brown hair, blue eyes, lived to 74, his mother (I. 2) dark hair, lived to 99; of his six siblings III. 2, 3 and 5, dark, 4, 6 and 7, hair lightish, eyes blue. Hair- and eye-colour of others: fair in degrees, and eyes blue when their colour is recorded, II. 7, III. 9, 13 to 16, IV. 7, 8, 12, 13, 24, 26, V. 2 to 7, 13, 16 to 18; dark in degrees, eyes usually brown, occasionally blue or gray, II. 2 to 6, IV. 1, 2, 3, 5, 9, 10, 11, 22, 23, 25, 26, 27 to 31, V. 10 to 12, 14, 19; remainder medium or colour not recorded. (C. H. Usher.)

Fig. 394. One incomplete albino and two very fair siblings. VI. 3, aged 8 (1906), hair, brows and lashes almost quite white, irides blue, choroids very light; no nystagmus recorded; refraction low H. As., H. 1.5 D. vertical, 2 D. horizontal, V. corrected $\frac{6}{8}$ partly each eye. VI. 1, aged 10, hair and brows very light yellow, lashes darker, irides blue, choroids very light, pupils not red and never have been, refraction R. H. 2.5 D., V. corrected $\frac{6}{8}$, L. H. As. 3 D. and 4.5 D., V. corrected $\frac{6}{18}$. VI. 2 fair hair and blue eyes. Mother (V. 16) eyes gray, hair now dark, was very light when a girl, her mother (IV. 26) dark hair and eyes, her father (IV. 16) dark hair, blue eyes, mother of IV. 26 (not shown) fair hair, blue eyes, father of IV. 26 (not shown) dark hair and eyes, mother of IV. 16 (III. 17) dark hair and eyes, father (III. 11) no record. Father (V. 2) dark hair, blue or gray eyes, his mother (IV. 12) dark hair and eyes, her mother (not shown) and father (III. 6) no information, his father (IV. 5) dark hair and eyes, parents of IV. 5 (III. 1 and 3) no information. Hair- and eye-colour of others: in VI. are 17 first cousins of the albino of whom four are fair with blue eyes, seven more or less dark with blue eyes, six dark with brown eyes; in III., IV. and V about 10 are given as fair with blue eyes, 30 dark with blue or gray eyes, and 30 dark with brown eyes, the remainder (about 20) not specified. (C. H. Usher.)

Fig. 395. II. 1, aged 28 (1896), fair skin, sandy hair, blue-gray irides, very slight nystagmus noticed only during ophthalmoscopic examination; choroids "almost albinotic and in the R., this is more marked in the lower (coloboma) part"; in L. (more myopic) some choroidal atrophy at yellow spot, none in R.; refraction R. My. 1.5 D. and 1 D., axes oblique, V. whether corrected or not, only $\frac{6}{18}$; L. My. 11 D. vertical, 9 D. horizontal, V. corrected $\frac{6}{60}$. II. 4, half-brother, said to have white hair and unsteady eyes. Father (I. 2), seen when 55 in 1893 for corneal opacities left by ophthalmia when a boy; very dark hair, married twice (I. 2 and 3); no note as to whether he had other children than the albinos and no note as to consanguinity, or complexion of I. 1, 2 and 3. (E. Nettleship. P. 37, 174.)

Fig. 396. St Thomas's Hospital, 1886. Three female albinos in a sibship of four (but not completed, the youngest being only four months old). II. 2, perfect albino, aged 10, with nystagmus, slight myopia, V. corrected $\frac{6}{30}$, fundus for each eye normal, except for total want of pigment; feeble minded, passionate and cannot talk plainly; no cleft palate. II. 1, aged 12, albino with moving eyes and very defective intellect, not seen. II. 3, aged eight, albino, cannot talk, not seen. II. 4, male, aged 3 months, no details. Parents, I. 1 and 2, both fair complexions, are first cousins. (E. Nettleship.)

Fig. 397. St Thomas's Hospital, December, 1889. Two albinos amongst five fair siblings. II. 3, aged 12, hair white at birth, now not quite white, nystagmus, refraction H. As., 2 D. vertical, 6 D. horizontal, V. corrected $\frac{6}{34}$; fundus albinotic; was thought to be blind for three months after birth. Nystagmus not noticed till she was about three months old. II. 5, aged nine, albinism like sister; nystagmus did not begin till some time after birth; refraction H. As., 2 D. vertical, 4 D. horizontal, V. corrected $\frac{6}{36}$. The other siblings (II. 1, 2, 4) all fair with blue eyes, one died at five of diphtheria, and two of "stomach." Father (I. 1), aged 40, and mother (I. 2) both fair. Consanguinity not noted. (E. Nettleship.)

PLATE XXXVII. Fig. 398. St Thomas's Hospital, January, 1879. One complete albino in a completed sibship of five. II. 1, aged 21, complete albino with nystagmus; refraction moderate H. and V. corrected $\frac{6}{36}$. Has had four siblings, two living (II. 2), two died (II. 3); no other particulars. Father (I. 1) said to be dark. Mother (I. 2) seen, hair nearly black, irides gray-green with brown sphincter circle, "an unusual colouration verging towards gray type." (E. Nettleship.)

Fig. 399. St Thomas's Hospital, 1882. Three incomplete albinos, and some normal siblings. II. 1, aged 16, "almost an albino"; very marked nystagmus, refraction My. about 2 D., V. corrected $\frac{6}{36}$; colour vision quite good. II. 2 very fair and has nystagmus. II. 3, aged three, fair but less so than II. 2, slight nystagmus. II. 4 several other siblings, not seen, their order of birth, complexion, and sex not recorded, all said to have good sight. Complexion of parents not noted; father (I. 1) good sight; mother (I. 2) "eyes nearsighted but do not move," not seen. No note as to consanguinity. (E. Nettleship.)

Fig. 400. Moorfields Hospital, 1892. Three albinos in an incompleting sibship of four; all seen. II. 1, aged six, albino with H. As., R. 2.5 D. vertical, 6 D. horizontal, L. 4 D. and 6.5 D.; hair yellow, the pupils red; nystagmus, noticed since about two weeks after birth and used to be worse during the act of sucking; slight rotatory movements of head said not to have been observed till he was 12 months old. II. 3, aged two, very fair, lashes almost white; slow nystagmus; refraction considerable myopic As., about 6 D. vertical and 3 D. horizontal. II. 4, aged four months; eyelashes almost white; lateral nystagmus,

much more marked when at the breast, and first noticed when about two months old; no head nodding. II. 2, aged four, brown hair and blue eyes; no nystagmus nor head nodding; refraction high H. As., 5 D. vertical, 7 D. horizontal. I. 2 said to have light blue eyes and "near" (*i.e.* very likely imperfect) sight; marked as ?albinotic; his siblings (I. 3) (number and sexes not stated) all "very fair." I. 1 dark. (E. Nettleship.)

Fig. 401. II. 1, complete typical albino, aged 22, with translucent irides, pink pupils and albinotic choroids; quick nystagmus; refraction H. with slight As. (4 D. and 5 D. oblique axes), V. corrected $\frac{6}{9}$; intelligent; born in United States but name is Irish. Says he has great difficulty in seeing at night and Mr Herbert Parker, who tested him with Förster's photometer, found considerable deficiency of light-sense. He is the first born of seven; his six siblings and both his parents, not seen, have dark hair. (Mr Marcus Gunn.)

Fig. 402. A sibship of nine in which all the males with blue or gray irides were myopic and the only one examined had an almost albinotic fundus but very little defect of sight. I. 1 and 2, parents, both very dark; consanguinity not enquired for; no shortsight in them or their parents, nor, as far as is known, in their siblings. II. 1, 6, 7, and 9, all have gray or blue irides; 6 and 7 have "short sight." II. 9, the patient, seen October, 1897, aged 16, myopia 4.5 D. with 1 D. of As., V. corrected $\frac{6}{9}$ partly, choroids very fair and all the vessels visible except at yellow spot area, hair now brown, but was extremely fair at first. Refraction in II. 1 unknown. Of the remainder, II. 2 and 3 died young with "good sight"; II. 4, brown eyes, not short sighted; II. 5, died at five months, brown eyes, black hair; II. 8 gray or blue eyes, not short sighted. Hair of all except II. 5 was originally more or less fair. The peculiarity is that the myopia appears to have been present from infancy and does not seem to increase. A slight appearance of lenticonus in II. 9. (E. Nettleship. P. 44, 59.)

Fig. 403. The albino girl, II. 1, from Oberliberg, Wolfrathshausen, aged 19 $\frac{7}{8}$, is very fully described by Kolb; of her two brothers nothing is said, except that they were albinos; the parents and three other siblings were normal. The girl was well nourished, good disposition, and of the sturdy bodily form of the mountaineers. Skin pale, delicate and spongy ("schwammigt"); hair "hellblond"; eyebrows thin, soft, pale yellow, pale and voluminous *caruncula lachrymalis*, cornea very thin and much arched; iris clear blue gray with rose red reflex, photophobia, not in high degree, till it increased as sign of her illness. Catamenia at 16, then ceased for a year, then returned for a year and a half and ceased finally, being the commencement of an attack of *iritis amenorrhoeica exsudativa*, which is very fully described by Kolb. (F. Kolb, *Journal der Chirurgie u. Augenheilkunde*, T. 37, S. 596—604, Berlin, 1835.)

Fig. 404. St Thomas's Hospital, June, 1887. One complete albino, aged two months (III. 3) and two very fair or incompletely albinotic; mother thinks III. 3 cannot see, but he dislikes bright light; no nystagmus as yet. III. 1, aged nine, reported to have almost white hair, but sight good and eyes not pink. III. 2, other siblings, particulars not given. Mother (II. 1) now has light hair and says it was nearly white in childhood; father (II. 2) no note. Mother's mother (I. 1) medium brown hair; mother's father (I. 2) was decidedly dark. (E. Nettleship.)

Fig. 405. This is the very famous case of the Chamouni or Savoy albinos, the brothers Grasset, who at the end of the 18th century created much interest among the numerous visitors to that part of Switzerland. They were described by Bourrit, Reynier, Saussure, Blumenbach and others. We follow principally Blumenbach. Both parents, I. 1 and 2, had brown hair and eyes, and the siblings, II. 4—7, were all like their parents. Reynier describes briefly II. 2 and 3 as boys of 10 to 12 years, and mentions, much in the usual way, nystagmus ("ils clignent souvent, le clignotement redouble quand ils fixent quelque objet"), photophobia ("ils voyent mieux les jours couverts et après le coucher du soleil"), blond almost white hair, clear red eyes, white and soft skin; when Blumenbach saw them they were 22 and 17 years old, which is scarcely in agreement with Reynier's estimate, but B. states that they looked 15 and 12. They were badly grown, the skin a peculiar red tint, and it fell off on rubbing in fine scales; both had got through the smallpox with few scars. The hair was of an unusual white, neither blond, nor silver grey as in the old, but falling into dirty yellow; it hung straight to the shoulders like white goat's hair; hair on pubes and rest of body of the same kind. Both were myopic, suffered from nystagmus and photophobia. Blumenbach says they could not see better by night than other men, but apparently he thought they could see more distinctly than others at dusk or by weak moonlight. He compares their eyes to those of albino rabbits, iris transparent midway between palest violet and rose red, pupils blood red, reflecting in certain directions a colour like raspberry juice. The younger, II. 3, had pupils of different sizes, the right being the smaller; II. 2 suffered from general ill-health and chronic ophthalmia. Both were intelligent and could read and write, the younger being the quicker in intellect. (Other tourists of that period describe them as shy and rough children.) Blumenbach comparing his experience with that of Bourrit, eight years earlier, concludes that the photophobia had lessened. Here the older writers' information ceases, but Carron du Villards, in 1838, examined in Paris two albino children¹, who were exhibited to

¹ They must have been young adults, or their father old at their birth. C. du V. is, however, somewhat vague; after remarking that de Saussure had questioned whether the Savoy albinos would live to marry and have albino children, he continues: "Les deux enfants que j'ai examinés dernièrement à Paris provenaient en droite ligne des individus observés par M. de Saussure. C'étaient un garçon et une fille: ils étaient frère et sœur, et fils d'un père albinos, marié à une femme brune." If this might be interpreted to mean *grandchildren* of a Savoy albino, we should have albinism in three successive generations.

the public as savages from the "l'île de Panama," but hearing them exchange a few words in a dialect familiar to him, he discovered they were Swiss, and ultimately what was more important, descendants, probably children, of one of the albino brothers Grasset. Unfortunately he does not say if they had any normal brethren. They were spoken of to the public as "human owls" whose eyes were tortured by the rays of the 'astre lumineux,' and the nystagmus, which they purposely emphasised, was said to be due to this excessive photophobia. They could both read, more easily with their back to the light, even holding the book at 24 inches distance. In the dusk they read well, although Carron du Villards could only perceive himself the letters very imperfectly. Actually they could go into a strong sunlight without other inconvenience than a running of the eyes. Of the iris we read "sa grande circonférence tirait sur le rose brun tandis que le bord papillaire était d'un rose sale clair. Je fis instiller quelques gouttes d'extrait de belladone dans l'œil gauche de chacun et l'iris se dilata complètement. La lumière devint alors plus fatigante pour eux; l'intérieur de leur œil avait un aspect singulier et ne ressemblait pas mal à un morceau de fer chauffé au rouge cerise." Carron du Villards does not describe their hair or skin, but says that they had the general characteristics of albinism. He has thus added to the famous Grasset group, albinos born from an albino. (Bourrit, *Description du Mont-Blanc*, Lausanne, 1776, p. 17; Von Berchem (Reynier), *Mémoires de la Soc. des Sci. phys. de Lausanne*, T. I., 1783, p. 21; De Saussure, *Voyages dans les Alpes*, T. II., p. 488 and T. IV., p. 303, 1779; Bourrit, *Nouvelle Description des Glacières et Glaciers de Savoie*, T. II., pp. 117—8, Geneva, 1785; Blumenbach, *Medizinische Bibliothek*, Bd. II., 1785, p. 537; *De oculis Leucæthiopum et iridis motu commentatio*, T. VII., p. 29 et seq., Soc. Roy. Göttingen, 1786; Carron du Villards, "Quelques mots pour servir à l'histoire...des yeux albinos," *Bulletin Méd. Belge*, Mars, 1838, p. 61.)

Fig. 406. Three completely albinotic siblings and some albinotic cousins (number not stated). II. 2, D. G., aged 18 (1881), complete albino; hair of head, brows and lashes white with slight tinge of yellow; skin rosy and very transparent and delicate; marked horizontal nystagmus; marked photophobia; iris gray-white, very translucent; pupil very red, measures 2.5 mm. in moderate light, mobility slow both to light and with convergence; refraction in R. My. 5 D., V. corrected $\frac{1}{10}$; L. My. 6 D., V. corrected $\frac{1}{8}$, no mention of astigmatism; reads only 6 J. and very close; sight not better in lowered illumination; visual field for white and the principal colours normal; colour perception excellent for all colours and the finest shades (tested by Holmgren's wools, Pfüger's contrast tables, Stilling's pseudo-isochromatic tables, Maxwell's disc, and spectroscope); fundi albinotic, optic discs appeared too dark, retinal vessels normal. (Author seems to have regarded the discs as unnaturally dark, but probably the appearance was only an effect of contrast; in most cases of strongly marked albinism of choroid the optic disc is absolutely darker than its setting. E. N.) Health and development good, but menstruation not yet begun. Has two brothers like herself (II. 3 and 4), no note whether any other full siblings but probably not as a dark ("black") half-sister (II. 1) is mentioned. Some children (II. 6) of a sister (I. 4) of the mother (I. 3) albinotic, but no details. Mother (I. 3), brunette. Father (I. 2), dark blond. No history of neuropathic disease in the family. No consanguinity. [Dr von Förster, *Klinische Monatsblätter für Augenheilkunde*, Bd. XIX. 1881, p. 389.]

Fig. 407. An albino parent residing in the north of England had a numerous family of children some of whom were pure albinos, while others had natural pigment of skin. There were several albino females in this gentleman's family. Interesting as another case of albino producing albino. (H. Marshall, "Sketch of the Geographical Distribution of Disease," *Edin. Med. and Surg. Journal*, 1832, p. 330.)

Fig. 408. Albino woman, II. 2, offspring of an incompletely albinotic mother, I. 2, married to a strong "nicht ganz brünetten" husband, II. 1, bore first a triplet and two years afterwards twins. The triplet consisted of three fairly healthy boys, of whom one lived a few days, the other several weeks and the third survived. "Probably with good attention, which was prevented by poverty, all three would have survived." The third suffers from rickets, but not in a marked degree. The twins, II. 4 and 5, at 1½ years were stout girls still at the breast and well developed for their age. None of the five children were albinos, but all had dark blue eyes and fair hair. Locus Bemburg in the Harz. (Dr Behr, *Wochenschrift für Gesamte Heilkunde*, 1836, No. 22, S. 348.)

Fig. 409. One complete albino, IV. 2, in a sibship of three, the offspring of an incompletely albinotic woman, III. 4, having no kinship with her husband, III. 2. III. 4 was very fair with blue gray eyes in which her friends used to say they "noticed sometimes a red flash." The father, III. 2, was very fair with blue eyes. After birth of IV. 1, who has dark brown hair and dark bluish gray eyes, III. 4 was seriously ill with rheumatic fever for a long time, IV. 2 was not born till five years after IV. 1, and this illness has been associated with his albinism. IV. 3 has dark brown hair and blue gray eyes. IV. 2 has fairly good general health, suffered partly from a nervous shock due to a scalding, and partly from eye inflammation as a child, and the eyes are at present inflamed by cold winds or long reading. Skin very fair; hair of head and body very fine and silvery white, had a yellowish tinge when a child and when much out of doors. Irides, light bluish gray "with islands of a denser colour"; pupils dark violet red. Hypermetropic, uses glasses without much profit, 1.50 both eyes, nystagmus, photophobia, "strong light blinds and causes headaches," in clear light, as when out of doors, usually keeps one eye shut when scrutinising anything. None of the relations are albinotic or suffer from defective eyesight. IV. 2 has taken his academic degree and is a minister in the Scottish Church. Mother's family; her brother, III. 6,

was fair becoming dark with age, the sister, III. 5, dark; the maternal grandfather, II. 6, black hair and dark eyes, and of Celtic origin; the maternal grandmother, II. 7, was married twice, she was light brown with blue eyes and her children and their descendants by previous marriage with II. 8 are fair. The father, III. 2, had three brothers with black hair and dark eyes, and his cousins, III. 3, are also dark. The paternal grandmother, II. 2, and her brother, II. 3, as well as their father, I. 1 were dark, but II. 1 was fair. No consanguineous marriages. (K. Pearson, from information provided by IV. 2.)

Fig. 410. Incomplete albinism of eyes only, limited to males; males with brown eyes and all the females unaffected. III. 13, aged 11, hair light, irides blue, choroid at yellow spot pale, but neither there nor in any part of the fundus any decidedly pathological appearances; nystagmus which was said to have been first noticed a month after birth; refraction high As., 5.5 D. in each eye, chiefly My. in R., chiefly H. in L., V. corrected $\frac{6}{80}$. III. 15, aged 7, irides blue-gray, nystagmus, refraction R. H. 5 D. vertical, 7.5 D. horizontal, L. 3 D. vertical, 6 D. horizontal. III. 12, said to have had blue oscillating eyes, died of meningitis. History as to I. 1 inconclusive; some relations say he had moving eyes and bad sight, others that he had good eyes; all agree that he was insane for a time but recovered; said to have been a good linguist; his wife and her only sibling (I. 2 and 3) had good sight. III. 11, and one each of 14 and 16, brown steady eyes and good sight, the other of III. 14, blue eyes but sight good and no nystagmus. Mother (II. 10), brown eyes, refraction slight H., V. $\frac{6}{8}$; father (II. 13), slight H., V. $\frac{6}{8}$; they are not consanguineous. Two male first cousins (III. 3 and 5), and a son (IV. 2) of their sister (III. 6) reported to be similarly affected, their mother (II. 2) being a sister of II. 10. Sight said to be good in all the others; eye-colour blue in III. 1, 2 and 8, II. 1, and her husband (not shown) and II. 5; eyes brown in III. 9, 10, II. 2, 3, 12. No information as to the others. (E. Nettleship, published in *Royal London Ophthalmic Hospital Reports*, xi., p. 366, Case XVII. (1887).)

Fig. 411. Two complete albinos in an incompleting sibship of four; IV. 1 died at two years of "congestion of brain"; had been always delicate; born with hair quite white, and exactly resembled the next albino; was intelligent. IV. 3, patient, complete albino; hair very long and slightly yellow at tips only, brows and lashes white; iris and pupil red, and outline of lens can be seen through iris; nystagmus; sees badly; refraction M. As. (amount not stated); is now aged 3. IV. 2, aged 5, hair darkish at first, now lighter; eyes blue and steady; V. good. IV. 4, aged 10 months, hair dark up to now, eyes blue, sees well. All four born at full time. Father (III. 15), married at 22, now 30, very fair with light blue eyes and wife says they shine pink by artificial light, but are steady and his sight very good for all distances. He is third of seven; six living, one ♀ died at 17; nothing known of his ancestors. His elder sisters (III. 13 and 14) have children (IV. 9 to 11), some dark, some moderately light. Mother (III. 1), blue eyes, light brown hair, is the fairest of her sibship of 13 and the first born; married at 21, now 29. Her sister (III. 2), married to a dark man (III. 3), has four children (IV. 5—8), none very fair; III. 4, 9 and 10, died in infancy or under five years; III. 12, youngest is seven; none of III. 1 to 12 are married except the first two. II. 3 was very dark; II. 2, blue eyes, light brown hair, was second of two, the other, II. 1, female ob. aet. 50, was also rather light. I. 2 died when II. 1 was very young; no information about him or his wife. No consanguinity of parents. (Mr Lang, April, 1908.)

Fig. 412. Fourteen albinos in a large pedigree in which various degrees of cousin-marriage have been very prevalent. The pedigree as shown makes no pretension to completeness; other families containing albinos and believed to be related in some degree to those here shown are known to exist; one such probably is shown in Fig. 307. The stock was originally from England, but the whole clan has been settled in the United States for many generations. The particulars furnished in Fig. 412 have been obtained for us at very considerable trouble by Dr F. W. Marlow, Professor of Ophthalmology in the University of Syracuse, New York, with the assistance of Dr W. L. Faxon, of Middleboro, Massachusetts. Hindrances of several kinds, not the least of them being the difficulty of inducing these people to let themselves be seen or to answer questions, have made it impossible, in spite of much endeavour, to carry the matter further; but we feel sure that the pedigree is correct in all essentials, and believe that, as regards albinism, it errs, if at all, on the side of omission.

Of the 14 albinos three have been seen by Dr Marlow, IV. 4, IV. 23 and V. 9, also her five children, not albinotic, VI. 4 to 8. The albinos IV. 15 and V. 10, 11, 12 died young, the last three of diphtheria; IV. 22 is also dead. The remaining six are living but could not be seen. The information was obtained by Dr Marlow, in part by correspondence from the husband of an outlying member of the family not shown on the Figure, and from V. 2, an intelligent and willing witness; in part personally on the spot when Dr Marlow and Dr Faxon visited a number of the members on 30 November, 1907. IV. 4, aged 77 (1907), hair white straw colour, eyelashes white; irides now slaty blue, said to have been much lighter formerly; sight has always been defective and she used to see better at night or on a cloudy day, "all our people see better at night than by day"; nystagmus; ophthalmoscopic examination refused. IV. 23, aged 75, hair straw-coloured; irides muddy gray; nystagmus, and sight very defective; refused to allow any close examination, but Dr Marlow thought he saw some opacity of lens in one eye. V. 9, aged about 40, white straw-coloured hair, white lashes; irides slaty blue; nystagmus; sight always "near" and could never read small print; her husband (V. 17), her first cousin, rather fair hair, steady eyes;

their five children (VI. 4 to 8), all fair hair getting darker with age, dull blue eyes, good sight, no nystagmus. Of the other albinos: IV. 25, aged 59, said to have pink eyes; V. 6 to 12 all have or had white hair and blue eyes, 6, 7 and 9 were living in 1906, all "near sighted" and 7 and 9 wear glasses. The children of V. 6 and 7 (VI. 2 and 3) said to be all more or less dark; of VI. 3, two are boys and wear glasses, two girls who do not. Of the remainder: IV. 18 and 19, reported by one informant to have had very light hair and dark eyes, but said by another reporter not to have been albinos, 18 is married but has no children, 19 died young; II. 6 to 9 said to have had dark hair and eyes; V. 1, all dark hair and blue eyes. It may be that when the albinos of this genealogy (IV. 4 and 23, and V. 9), speak of "dark" relations they sometimes mean only "not albinos." IV. 25 is the only one whose eyes are said now to be "red" or "pink"; but newspaper reports had previously spoken of "the red-eyed" members of the clan, and the examinations by Dr Marlow and Dr Faxon being made in open daylight were of necessity inconclusive on this point. The very complicated consanguineous marriages so far as we know are as follows; it has not been possible to mark all of them on the Figure in the usual way: (II. 8 and 9, first cousins); III. 1 and 2, cousins; III. 3 and 4 also 6 and 7, respectively first cousins; III. 10 and 11, first cousins by their fathers, second cousins by their mothers; III. 1, second cousin of III. 10 and 11; IV. 5 is first cousin of III. 10 and 11, and is therefore also related to III. 1; III. 7 and 8 said to have been related, but degree unknown; III. 5 and IV. 1, first cousins, once removed; IV. 4 and 5, cousins in some degree through III. 1, 10 and 11; V. 9 and 17, first cousins; V. 5 and 6, said to be cousins by one reporter, but this denied by another. (Dr F. W. Marlow and Dr W. L. Faxon, U.S. America.)

PLATE XXXVIII. Fig. 413. Three, probably four, albinos in a large genealogy. III. 3, aged about 60 (1908), unmarried; hair, brows and lashes light yellow, skin fair; irides blue; nystagmus; can read moderately small print held close; refraction myopic, some opacities in lens (examination incomplete). Her siblings (III. 1, 2, 4) fair in degrees when younger. Mother (II. 2) and both her parents (I. 1 and 2) dark. Father (II. 7), reddish, his father (I. 4), dark, mother (I. 3) no information. V. 4, aged $2\frac{1}{2}$, "blind-fair," very fair hair, blue irides, albinotic fundus, and slow lateral nystagmus; refraction H. As. 3.5 D. vertical, 6 D. horizontal. His only sibling (V. 3) reddish hair, blue eyes, no nystagmus. Mother (IV. 4), hair now light yellowish, was as fair as V. 4 when a child, eyes blue, fundus not suggestive of albinism; refraction slightly H., V. $\frac{6}{8}$; of her nine siblings only one (IV. 3) really dark, all the others blue eyed and several were quite fair in early life. Father (IV. 11), is fourth of 15 conceptions, 12 born alive, three miscarriages, one (second born) died of phthisis at 19, 11 living, none very fair, some red-haired. V. 22, aged four months, elder of male twins, hair, brows and lashes quite white; slow lateral nystagmus (25 to a minute); pupils red, irides translucent at periphery; fundus very white except at yellow-spot region; refraction under atropine (measured by both authors separately, by shadow test) H. As. 4 D. vertical, 8 D. horizontal. The other twin (V. 23), dark hair, brown iris, dark fundus; refraction carefully measured under atropine 5 months later (aged $\frac{6}{12}$), R. H. 4 D., L. H. 3 D., no astigmatism. Mother (IV. 34) aged 29, black hair, brown eyes, dark fundus; refraction H. As. 1.5 or 2 D. each eye. Of her two siblings (IV. 33), one dark, the other light with blue eyes, married nine years, no issue; of her seven half siblings (IV. 35 to 38), one (IV. 36) was at first thought to be albino, but now hazel iris, dark hair and choroid; several have always been quite dark, and two of the six light. Father (IV. 28) and five of his six siblings quite dark hair and eyes; IV. 30 dark hair and blue eyes, the other twin (IV. 29) fair, with blue eyes. III. 13, an only child, had fair hair and "short sight," and is thought by III. 14 to have been an albino; she died in her school years; complexion of her parents unknown. III. 16 was, like IV. 36, so fair in early life that albinism was feared, but had good sight. Hair- and eye-colour of others: fair in degrees or red or auburn with blue eyes, three out of II. 7 to 15, about 20 out of about 30 in III. 14 to 19 and their children in IV., *not all shown*, and several of III. 7 to 12; dark in degrees, 10 out of 30 in III. 14 to 19 and their children, most of 23 to 36 and two of II. 7 to 15. (Dr Souter and C. H. Usher.)

Fig. 414. One nearly complete albino and two very fair siblings out of five. V. 8, aged five (December, 1907), hair extremely fair, not quite white, brows a little more coloured, and lashes rather darker than either; irides blue, pupils decidedly red; choroids extremely light, least so at yellow spot; rapid lateral nystagmus; refraction H. As., R. H. 2.5 D. vertical, 7 D. horizontal, L. H. 1 D. and 5 D.; skin uniformly fair all over, cheeks red, easily blisters in sun but never freckles; healthy and intelligent. V. 7, aged six, hair light yellow, rather more coloured than V. 8, brows and lashes the same, but lashes darkest of all; irides blue, pupils black but show red in certain lights; choroids look as albinotic as V. 8; no nystagmus; refraction almost normal, V. $\frac{6}{12}$ with each eye; skin exactly same as in V. 8 in colour and characters and does not freckle; intelligent and healthy. V. 10, aged two, hair like V. 7, a little darker than V. 8, brows rather darker and lashes darker still; irides blue, pupils black but occasionally red in certain lights; choroids as light as in the other two; no nystagmus; refraction H. As. 3.5 D. vertical, 5 D. horizontal in each; bright healthy child, born at seventh month. V. 8 is decidedly fairer both as to hair and eyes, than the other two, has nystagmus and higher ametropia, but V. 10 also has considerable ametropia. V. 6 and 9 dead and no information. Mother (IV. 28), hair, formerly very light, now dark brown; eyes blue, red reflex seen in pupil once; choroids light; refraction about normal; she is sixth of

nine, and the first five were all fair in degrees, IV. 24 and 27 markedly so. Father (IV. 5), hair light yellow, skin fair, eyes blue, no nystagmus, choroids decidedly light but not nearly so light as in the albinotic children; he is fifth of seven (IV. 1—7), every one of them described as fair, and the eyes, when specified, blue-gray. III. 1, father's father, now 59, very fair, and it used to be said "he would never turn gray," eyes blue. Hair- and eye-colour of others: fair, III. 3, 5, 20, 25, 26, 34—36, II. 21 (very), 15, V. 3—5, one of 14 = about 28 in all; dark, III. 11, IV. 7—9 = about 14 in all; medium, II. 17—19 and issue, III. 2, 4, 6—15, 24 = about 83 in all. (Dr Souter and C. H. Usher.)

PLATE XXXIX. Fig. 415. A noteworthy case. I. 2 was a negress, aged 16, although looking 30, she was an albino seen in Mascareigne but purchased in Madagascar; she had two children, II. 2, by a white, and II. 3 by a black, they had the features of their respective fathers, but "la couleur blafarde," and the whiteness of hair of the mother. Their eyes feeble (photophobic?), were not red, but very light chestnut as is the case occasionally with negro albinos. (Bory de St Vincent, *L'Homme essai zoologique sur le genre humain*, Paris, 1827, p. 145. *Repetition by oversight of Fig. 289.*)

Fig. 416. Bishop Harman saw in a Kaffir village near Pretoria two albinotic Kaffir children, females; the iris a dirty slate colour turning dusky red in some lights; hair, "pepper-corn" in character, of pale yellow colour. Father and mother quite black. No other details. (*Trans. Ophth. Soc.*, xxvi., 250, 1906.)

Fig. 417. IV. 1, albino girl, Bodowa aged about six; skin quite white all over and easily burns from exposure to sun; it shows no pigmented spots; eyes very intolerant of bright light; hair flaxen coloured; irides grayish blue; choroid appears quite free from pigment on ophthalmoscopic examination; no note of colour of pupils. Has a patch of ringworm below umbilicus, shown in photograph; other spots seen on various parts of the albino's skin in some of the photographs are due to imperfections in the negatives: see our Plates V and W. IV. 2, normally pigmented younger brother apparently aged about four. Parents (III. 1 and 2) normally coloured, *i.e.* brown, skin. II. 1, an albinotic brother of the paternal grandfather of IV. 1; this albino lived only five days. Bodowa (IV. 1) is a native of Woodlark Island, Papua, containing about 3000 people on 600 square miles. The people are divided into seven tribes named Flying Fox, Hawk, Cockatoo, Blue Pigeon, etc., and the many surrounding islands have the same tribes. No marriage rites. "They live in villages, cultivate the land and practise communism in each village." The children are named after the tribe to which their mother belonged; thus Bodowa is a Blue Pigeon because her mother was of that tribe. Sibships usually small, four or five as an average. The adults age early. The skin is normally brown, but often appears fawn-coloured in places owing to extensive areas of ringworm. As to cousin marriages, the aboriginals (Papuan of Woodlark presumably) say that the children of brothers and sisters never marry. No other albino known on Woodlark Island, but two reported on Gowa and one on Kitava, two islands close to Woodlark. (Mr John Taaffe, Woodlark Island, to Dr Jones, and by him to C. H. Usher.)

Fig. 418. Tamil albino from Trichinopoly, seen by Dr H. Fraser about May, 1908, at Kuala Lumpur, Federated Malay States. III. 1, aged 16, came to Kuala Lumpur (as a coolie) nine months ago; hair fair; skin dirty white, much freckled on back and front of chest and arms, less so on face, and no freckles at all on lower extremities; does not wear much clothes; irides hazel; marked nystagmus; refraction myopic; fundus does not show choroidal vessels (*i.e.* choroid must contain pigment in some quantity); photophobia not marked. See Plate Q. Has one brother and one sister of normal dark colour. Mother (II. 1) an ordinary Tamil; father died when III. 1 was young and nothing is known of him. Colour of skin and hair of III. 1 negated the possibility of his being an Eurasian. It is said that the grandfather (I. 1) was an albino Tamil. (Dr H. Fraser, Kuala Lumpur, Federated Malay States, through C. H. Usher.)

Fig. 419. Six albinos and two others with white patches, in same pedigree. III. 2, Joesoef R. aged 24 native of Minalassa, N. end of island of Celebes, an albino; has been seen by Dr Alers (no particulars); his three brothers (III. 1) are all normally pigmented ("brown"), but three of his seven sisters (III. 6, 7, 8) are albinotic. One of the normal ("brown") sisters has a child (IV. 1) with a pigmentless spot on head. Father (II. 4) is normally brown except for some white patches on the hands; one of his three siblings (II. 1) is an albino; their father (I. 1) also an albino. Mother (II. 5) normal brown. It is not certain from the notes that either II. 4 or IV. 1 was seen and the nature of their white patches must therefore be considered doubtful. (Dutch Captain-Surgeon Dr L. T. C. Alers, stationed in the Celebes, Case 1. Sent from Makassar through C. H. Usher.)

Fig. 420. Family W. Father (II. 1) native; mother (II. 2) half-caste. Amongst their five children: III. 2 and 3 are albinos with nystagmus. III. 1 hair and eyes light brown. III. 4 and 5 light coloured skin, black hair. I. 1 and 2, parents of II. 1, said to have been fair. IV. 1 and 2, two albinotic children whose father (III. 6) was called "the white"; his mother (II. 3) was also very fair and was a sister of II. 2; nothing said about II. 4. (Dr Alers, Case 2.)

Some of the above information was given to Dr Alers by one of the sons-in-law of II. 1 in his Case 2, "a very intelligent and trustworthy person," who also told him of the cases mentioned below. Dr Alers states that the natives of Celebes assert that albinos come from marriage between two

light-coloured natives, and also from marriage of a light-coloured native with a half-caste. Of the latter he gives the following on the authority of the above son-in-law :

Case 3. A native married a half-caste, and the pair had two albino children.

Case 4. A similar union to the last, gave one albino child.

Dr Alers himself has also seen albinotic children of marriages between Chinese men and native (Celebes) women but has had no opportunity of examining them. In the albinos Dr Alers has himself examined in Celebes he has always found photophobia and nystagmus, and he states further that "they were freckled" but gives no particulars of the latter character.

Fig. 421. Two albinos on Pitcairn island, the offspring of a woman (III. 5) whose father (II. 2) has been insane several times and belongs to a stock in which mental instability is very common. The albino IV. 4 died from an accident; IV. 5 was seen by Staff-Surgeon F. F. Lobb, R.N., of H.M.S. Pegasus in 1907; he was about 18 and so devoid of pigment as to be practically an albino and appeared mentally dull, but no opportunity occurred for examining him in detail. III. 5 had another child (IV. 6), illegitimately by her first cousin (III. 7); this child is epileptic, and the father (III. 7) was hanged for a brutal murder. (Communicated by Mr W. H. Petch, formerly Government Secretary of Pitcairn Island, to Staff-Surgeon F. F. Lobb, R.N., and by him to C. H. Usher.)

Fig. 422. Papuan albinos, Wanahari village, Taupota district, N.E. coast, 20 miles from East Cape. I. 1, named Kamasina, an albino, was married but died childless. IV. 1, Waideamani, an albino girl, aged about ten years (1908) is the great-granddaughter of a sister (I. 2) of I. 1. No other particulars. (Sent by the Rev. Copland King through Dr R. F. Jones of Samarai to C. H. Usher, April, 1908.)

Fig. 423. Papuan albinos, Porimutuna village, Taupota district. I. 2, a female albino who left no issue; her name unknown. III. 1, Kavukavu, an albino boy aged about ten (1908); his maternal grandmother (I. 1) was sister of I. 2. No other particulars. (The Rev. Copland King, as above.)

Fig. 424. Papuan albinos. I. 2, a native of Hoola, New Guinea, aged about 50 (1908); skin and hair reported by his daughter (II. 2) and her husband (II. 1), who is a European, to be and always to have been quite white; he is called an albino. His brother (I. 1) and wife (I. 3) both living, ordinary dark brown natives, also his four children (II. 2 to 4). III. 1, five "half-caste children" of II. 1 and 2 "with yellow skin, black hair and dark brown eyes." (Mr John Taaffe, through C. H. Usher, April, 1908.)

Fig. 425. From Yam in Torres Straits. Three albinos of Papuan race described as showing considerable pigmentation as the author states Papuan albinos always do. II. 1, Siai, ♀ aged about 25 (1898), tow-coloured hair and eyebrows, eyelashes rather darker, axillary hair light tow-coloured; skin between shades five and six on chart in *Notes and Queries on Anthropology*; palms and soles very pink; nipples "lighter than in many Anglo-Saxon brunettes" (she was suckling); irides light brown; no marked intolerance of light; no note as to nystagmus, refraction, vision or ophthalmoscopic appearances. III. 4, Sergi, ♂ aged about 7 (1898), nephew of the last; hair, brows and lashes as in II. 1, skin rather darker on body than on face (*sic*); hair of body and forehead white; irides light brown; no marked photophobia; other details wanting. II. 4 "putative father" of III. 4. Mother of III. 4 not shown and apparently not known with certainty, but author states there is little doubt that III. 4 belongs to the same "family" as II. 1, and as he says II. 4 does *not* belong to this family we must assume that the mother is a member of it; the line joining II. 4 with I. 1 must therefore be taken as connecting them indirectly through the wife of II. 4. I. 2 Aker, ♀, dead (1898), described as having had very light skin "though not a typical albino" and as also having developed marked leucoderma from the age of 15 onwards; we have therefore ventured to insert "?" to this case on the author's pedigree. (Seligmann, *The Lancet*, 1902, II., 803, Fig. 1.)

Fig. 426. Dinga family of Nyassaland. The incomplete general type of albinism with *café au lait* coloured skin.

Four albinos in three generations; III. 5 the only one seen, aged 4—5 years (June 1905), intelligent and normal except as to colour; features "approximate rather more to Caucasian type than usual, nose not so spread, nostrils not so large, lips not so thick as usual"; skin uniformly orange-pink, rather deeper than many other albinos of this type, no pigment in sclerotic; iris darkish hazel; no nystagmus; no photophobia; sight seems good; hair of head very light straw colour, arranged in tight curls, eyelashes yellowish-white, long and much curved; entire trunk, shoulders, back of neck and arms covered with fine, downy, light-golden hairs, curved but not curly. Father (II. 1) a Chikunda of Senna, seen; is of the average colour of his tribe with dark hazel irides; the people of Senna are commonly lighter in colour than other tribes. He says he had an albino brother (II. 2), that his father (I. 1), and his own eldest child (III. 1), who died in infancy, were albinos; of his seven children only three are living (III. 2 (one), 4, 5). (Dr Hugh S. Stannus, Case 1.)

Fig. 427. Three Nyassaland albinos in two generations. II. 3, Ng'ombe, aged 25 (February, 1906), says that at birth and for some years after his skin was pink all over; since then the present condition

has gradually come on; now the skin is rosy pink and free from pigment on all non-exposed parts, viz. all parts from the umbilicus downwards including genitals, axillae, flexor surfaces of arms, palms of hands, under surface of chin and neighbouring part of throat; but all parts commonly exposed to sun, viz. face, most of the neck, chest, back, upper part of abdomen and extensor surfaces of arms and forearms, present patchy pigmentation; many of these deposits of pigment are seated in what appear to be the scars of small ulcers due to sunburn, the colour varying from that of a light freckle to that of the skin of his normally coloured brother (II. 5), the deposition whether light or dark being irregular in distribution on each individual spot or freckle (some of the spots look more like freckles than scars); the skin itself is dry, and in many places hard. Nails of fingers and toes well formed and no pigmentation either of them or of mucous membranes. Hair of head, whiskers and (small) beard and moustache, also eyebrows, lashes, and hair on external ears light straw colour, slightly darker on top of head than elsewhere; axillae and pubes shaved; nystagmus; photophobia; V. good he says (counts fingers at 6 m.); pupils normal; irides pale grayish greenish blue owing to presence of yellow pigment especially in the pupillary zone; no pigment in sclerotic; fundi normal (no note of their tint); features those of average native; has an umbilical hernia but otherwise of good bodily development. See Plate Y. Has been married twice, by first wife (II. 2) had an albinotic child (III. 1) that died at two years old; by second wife (II. 4) no children yet. His elder brother (II. 1) was an albino but died at five years of age. Father (I. 1) and other brother (II. 5), both living, have dark reddish brown skin and irides a light shade of dark brown. No particulars recorded as to mother (I. 2). (Dr Stannus, Case 4.)

Fig. 428. Two albinos in a sibship of four from Nyassaland. III. 3 and 4, two albino sisters, aged five and six years (May, 1906). See Plate Z. Skin quite devoid of pigment, well protected by clothing and hat and in good condition; hair on head woolly, light straw colour, entire back and arms covered by half-curly hair, eyelashes long; some photophobia; nystagmus; V. fairly good. The above description applies quite equally to each of the two sisters; the only difference between them is in the irides; in the elder (III. 3) they are slaty-blue at periphery passing into light greenish hazel towards centre but without a well-marked peri-pupillary ring of pigment, whilst in the younger (III. 4) they are blue. The two elder siblings (III. 1 and 2) are dead; they were not albinotic. No other albinos known in the family; Mother seen (II. 2), dark, she had four sibs, all dead (II. 3 to 5); father (II. 1) not an albino. Mother's mother (I. 1) seen. (Dr Stannus, Cases 6 and 7.)

Fig. 429. One albino Fijian girl, aged 7 (February, 1908), named El-eno-a (IV. 3), from village Korolevu, district Noikoro, province Colo West, centre of Viti Levu. Hair light yellow; child became deaf and dumb after measles when about three years old. She is the second of two, the elder (IV. 2) being a normally pigmented boy. No known consanguinity. There used to be an albino in the Matagali of I. 5, the father of the mother of the mother of IV. 3; this albino died about four years ago probably aged 20. I. 1 and 2 were from different branches of the same Matagali. II. 1 and 4 were from different districts. III. 3 and 21 were from different districts. (From Mr J. A. Allardyce through C. H. Usher.)

Fig. 430. Chesiwandivi, of Nyassaland, January, 1906. One albino in sibship of six. II. 3, aged 16, average development, shy and timid; skin pink, very dry, cracked and scaly with some sores from sunburn; no hair on body; hair of head light straw colour in tight curls, brows and lashes same colour; marked nystagmus and photophobia; pupils act well; irides light gray-blue at periphery gradually passing to light hazel at pupillary border, the pigment in the iris itself being orange in colour. Features typically African; no pigment in mucous membranes, nails, areolae of nipples or sclerotics. See Plate Y. Father (I. 1) seen, formerly very light brown in colour but has darkened with age; hair now black, beginning to turn gray, irides lighter brown than usual, skin colour medium brown. Mother (I. 2) very dark. Of the five siblings the eldest daughter (one of II. 2) said to have very light brown skin, the other four very dark. (Dr Stannus, Case 3.)

Fig. 431. Two Nyassaland albinos in a small pedigree. II. 4, aged one year (April, 1906), very fine white skin quite free from sores, having been carefully tended by mother; no pigment in skin, mucous membranes, sclerotic or nails; hair of head very light straw colour; eyebrows and lashes the same; fine, downy curved hairs on face and all over the body of same colour as hair of head; nystagmus; photophobia; irides slaty-blue with peri-pupillary orange or yellowish pigmentation; sight good for large objects; child lively. See Plate Y. The two siblings II. 2 and 3 light brown skin with hazel eyes; mother (I. 4) the same. Father, Mtila (I. 3), dark, height 6 feet $3\frac{1}{4}$ inches, healthy and shows no signs of acromegaly or gigantism; his elder brother (I. 1) seen, of average darkness; second brother (I. 2) not seen, is albinotic, but his son (II. 1) is not white. (Dr Stannus, Case 5.)

Fig. 432. Partial albinism, hair and skin only, in two, probably three members of a Nyassaland family. III. 2 and 3, brother and sister, aged about 60 (May, 1906), both alike as regards the albinism; features less negroid than usual, the brother (III. 2) having a decidedly "Roman" nose. Skin yellowish brown all over the body, was formerly fairer and has become gradually more dark, it is thick, creased and wrinkled; on the back is half curled hair; sister's (III. 3) head shaved, brother's (III. 2) head bald except tufts above ears which are yellow straw coloured; irides hazel; no nystagmus; "sight has always been good" but III. 3 now has senile cataract in R. eye. III. 3 has three children (IV. 1, 2, 3) all seen

and found to be black. Mother (II. 2), second of three, said to have been quite black, and no albinos in her generation; but her mother (I. 1) said to have been like the albinos III. 2 and 3. (Dr Stannus, Cases 8 and 9.)

Fig. 433. One Nyassaland albino in three siblings. II. 3, aged 4 years (July, 1906), skin light *café au lait* colour presenting some dark areas; most of these were dirt and would wash off, but a few on face and limbs were truly pigmented; fine half-curved downy hair on body, of same colour as hair of head; hair of head light straw colour, eyebrows and lashes light brown, the lashes darker than the brows; no pigment in sclerotic, or nails, or mucous membranes; photophobia; nystagmus but only slight; V. little if at all affected; irides light uniform brown colour. (Dr Stannus, Case 11.)

Fig. 434. Two incomplete general albinos in sibship of three in Nyassaland. II. 2, Chesekumbiri, aged 14 (February, 1908); features of ordinary native cast; *café au lait* coloured; hair of head golden brown, eyebrows and lashes of same colour, the lashes are long; hair over body and limbs fine and half curved. Lateral nystagmus; slight photophobia; irides light brown. He says his elder brother (II. 1) is exactly the same as himself; younger brother (II. 3) seen and is normally dark. No information about parents. (Dr Stannus, Case 12.)

Fig. 435. I. 1 and 2, normal Cingalese parents living in 1807 in a hut one mile south of Columbo on the road to Point de Galle. II. 1 and 2, two albinos, their whiteness pale and livid, their appearance sickly and delicate; hair, eyebrows and lashes and down upon their skins, perfectly white and a very fine soft texture. Iris a beautiful blue and white, extremely pure. Their eyes very weak and generally closed; unable to see in bright sunshine and sight at all times feeble; constitutions languid. Both parents were apparently healthy and had a son younger than the albinos, perfect black and as stout and robust as any of his countrymen. (Rev. James Cordiner, *A Description of Ceylon*, London, 1807, Vol. i., p. 125.)

Fig. 436. A female albino, II. 2, with a normal child in Sigatoka village, Nadroga, Viti Levu, Fiji (not seen). (Mr Allardyce, through C. H. Usher.)

Fig. 437. About 1738 a negress bore at Carthagera in Colombia at four confinements four albino offsprings. All four had hair "d'un jaune d'orange vif," the skin the colour of fine white paper without the least mixture of red. One of these albinos was shown at Madrid, where the Marquis de Villa-Hermosa, formerly governor of Carthagera, had taken him, the second was in the service of Don Dionysius de Alcedo y Heneva, both died young. What became of the other two is not recorded. (de Pauw, *Recherches philosophiques sur les Américains*, 1768—89, T. II., pp. 14—29.)

Fig. 438. An albino from the Black Forest with two non-albinotic children. (E. Esquirol, *Des maladies mentales*, Paris, 1838, p. 368.)

Fig. 439. II. 2, born of normal parents, was a complete albino and had normal siblings, number not given; he had by a normal wife, two very brown children; he was myopic, of delicate constitution, and of ordinary intelligence, "bon, facile, mais timide." (*Ibid.*, p. 368.)

Fig. 440. I. 1 and 2 two normal genuine Papuans from Arfak hills New Guinea. They had a son, II. 1, and a daughter, II. 2, both albinos, no statement as to other offspring, or as to consanguinity, though author apparently supposes all albinism due to consanguinity. II. 2 seen, aged 16, well grown and developed girl; skin rose white as that of European with many light yellow spots supposed by Meyer to be freckles (Sommerprossen); the hair ruddy blond; the irides blue, with marked nystagmus, head turned invariably down to protect eyes from light. Repulsive feeling produced by dirt on the skin usually hidden by the dark Papuan tint. In the bloom of her youth, much courted by natives notwithstanding or owing to her colour. (A. B. Meyer, "Anthropol. Mittheil. über die Papuas," *Mittheilungen der Anthropol. Gesell. in Wien*, Bd. iv., Nr. 3 and 4, Section 2, 1874.)

Fig. 441. Jappe, III. 2, a well-developed Myambaam of about 22 years of age. Of very light, almost white colour. His skin has more the healthy colour of a European somewhat sunburnt, than the deadly white of the pure albino: see Plate CC. The iris, wool on head, slight moustache and beard, and pubic covering are of brown colour. No signs of any eczema on the skin, no nystagmus, but a marked squint. He states that his grandfather, I. 1, was black, but his grandmother, I. 2, was a pure albino. His father, II. 2, was the same colour as himself, but he married a white Kaffir woman, II. 1. Jappe has himself married, III. 1, a pure black Myambaam girl and has two children by her, IV. 1 and 2, both of the same white colour as himself. We can therefore trace this family history back to an albino grandmother, I. 2, and the white Kaffir, II. 1 (found on enquiry to be an albino also), and it appears that there is a tendency of albinism mixed with pure negro blood to produce Xanthism. (Dr Geo. A. Turner, Medical Officer to the Witwatersrand Native Labour Assoc. 1907, through Prof. Reid of Aberdeen.)

Fig. 442. One albino, unusually perfect for one of a dark race. II. 2, named Dolah, aged 40, native of Sumatra from whence he came to Kuala Pilah, Malay States, two months ago (March, 1908) to get work. Hair of head shaved (according to custom); eyebrows, eyelashes and slight moustache white; skin very white; some freckles on face and upper part of body; irides very pale blue colour and devoid of

pigment, marked nystagmus; refraction myopic by shadow test; choroidal vessels distinct, but fundus not pale; red reflex through the pupil; also through periphery of iris and through sclerotic. Married and has one child (III. 1); no details about this child nor about mother (II. 3). No albinos known among his relations. Consanguinity not directly mentioned, but Dr Fraser reports on what he regards as good testimony that cousin marriages are very rare amongst the ordinary natives of Malaysia in general though they are much more frequent in the royal families and in Perak. (Dr H. Fraser, Case iv., through C. H. Usher.)

Fig. 443. I. 1 and 2 native dark-skinned Indian parents, an excellent photograph of whom with two children, the elder certainly a boy, and the younger probably, both albinotic, was reproduced by Mr Jonathan Hutchinson. The data given are very meagre, we are not told whether there were any other albinos, but merely, "In the case before us there were nearly as many black brothers and sisters in the family as there were albinos." There must have been more than *one* normal sibling therefore, and if so, "nearly as many" suggests at least one more albino. Mr Hutchinson has not, however, been able to discover the notes of the case. (Mr J. Hutchinson, "On Family Diseases as illustrated by Albinism," *The Polyclinic*, Vol. vi. pp. 381—4, 1902, with a photograph by Major Grayfoot to whom the case is due.)

PLATE XL. Fig. 444. Four albinos in an extensive Fijian pedigree; Waikama village on Gau island. IV. 18, Asene, albino girl, aged about 11 (1907); skin fair with freckles chiefly on face and back; hair fair; iris blue; constant lateral nystagmus; fundus not examined. V. 4, Sera, girl, aged four, very marked albino; skin very fair, some freckles on ears only; hair, lashes and brows white; iris blue; constant lateral nystagmus; fundus not examined. These two were photographed together, back and front, both very frightened and crying. See Plate T. IV. 13, an albino half-brother of IV. 18 by same father, died at 50. These three albinos are all from the same Matagali (Burei) and the two living ones (IV. 18 and V. 4) from the same village (Waikama). IV. 22, Etonia Bian, aged about 36, whom I saw at Waikama in 1907, is through his father's mother (II. 23) and her father (I. 4) of the same (Burei) Matagali as the other three albinos, and therefore all four are related by blood in some degree; IV. 22 himself has fair, but much freckled, skin; hair, brows and lashes yellow-brown, the lashes being lightest; irides blue; photophobia; no nystagmus; no ophthalmoscopic examination. See Plate V. 65 and 68. Though he has no nystagmus no one seeing him would hesitate to call him an albino; in Waikama we saw many conspicuously fair-skinned inhabitants and no doubt saw many of the relations of the albinos, but there was not time to identify each one. In the pedigree the following belonged to the same (Burei) Matagali as the albinos: I. 4; II. 1, 3, 23; III. 1, 4, 7, 9, 10 and 11; from the same village as the albinos (Waikama) but not the same Matagali, II. 6, 7, 8; neither inhabitants of Waikama nor of the Burei Matagali, II. 2, 9, 18, 19, 21. III. I was an only child; it is not known whether II. 21 had siblings. (C. H. Usher.)

Fig. 445. Albinism of choroid and posterior surface of iris only; very fair hair becoming darker with age. IV. 3, lady aged 27, seen by Professor Fuchs in November, 1907; said by mother (III. 1) to have been very fair in childhood; hair now light brown with golden tinge; the eyes also became darker with age, and the irides are now greenish brown and not light coloured; they have a perfectly normal appearance when examined from the front with and without a magnifying lens, but show a peculiar shining appearance which further examination proves to be due to transmission of light reflected from the fundus. When light is concentrated on anterior part of sclerotic behind the iris the pupil becomes red, and the iris looks perfectly red, or more correctly it disappears altogether with the exception of a dark ring at the situation of the sphincter pupillae (thickest part of iris). This appearance appears to indicate that, though the fibrous tissue of the iris is tolerably well pigmented its uveal layer is devoid of colouring matter,—just the counterpart of the ordinary "blue" iris. No nystagmus. Refraction highly astigmatic, R. -2 D. sphere and $+3.5$ D. cylinder, axis vertical, V. $\frac{5}{24}$, L. $+3$ D. cylinder, axis vertical, V. $\frac{5}{18}$. Fundus of eyes quite albinotic, the intervacular spaces of choroid rose-coloured at posterior part, perfectly white at periphery. She is fourth of seven; one of her brothers (IV. 2) was very fair in early life but now has brown hair; he has not been seen. Parents (III. 1 and II. 2), well pigmented, are half uncle and niece through I. 2 who married twice. (Professor Fuchs, Vienna, Case 1.)

Fig. 446. A Vienna Jew, aged 72 (II. 7), with incomplete general albinism affecting the eyes especially. Hair always very light, now perfectly white from age; brows and lashes still light rusty colour; very marked nystagmus; irides in ordinary light greenish blue, as in many normal eyes, with numerous small brown spots, most of them in the pupillary zone, a few at the periphery; but in L., when light is concentrated on the sclerotic, the whole area of iris and pupil becomes uniformly red except a ring of shadow corresponding to the zone of most densely placed brown spots a little peripheral to border of pupil; fundus albinotic; commencing cataract; V. fingers at 2.5 m.; refraction My. As. 1 D. and 4 D.; R. nearly complete cataract, fingers at 1 m., fundus invisible. He has a son (III. 3) with brown hair who has two children (IV. 1 and 2) both with very light hair. I. 2 and 3 not consanguineous, both dark brown hair; no albinism known in their siblings or ascendants. II. 1 to 8, seven ♂'s of whom five are albinotic, three ♀'s none albinotic; one of the normal brothers of II. 7 has two albino daughters (III. 1, 2). In the absence of details, II. 3 to 6 and III. 1 and 2 are marked as incomplete like II. 7. (Professor Fuchs, Vienna, May, 1908.)

Fig. 447. One incomplete general albino, aged 27 (II. 1); hair now pale dull brown but was very fair (some of the hairs are lighter and appear to contain more yellow than others); eyebrows and lashes almost white; irides pale slaty blue, pupils not red; fundus decidedly fair but would not suggest albinism; rotatory nystagmus; R. mixed As. My. 2 D. nearly vertical, H. 3 D. nearly horizontal, V. corrected $\frac{6}{24}$; L. H. As. 1.5 D. nearly vertical, 4 D. nearly horizontal, V. corrected $\frac{6}{18}$. Has three sisters (II. 2, 3, 4), all said to be very fair, one fairer than patient; one of them married and has seven children (III. 1) all very fair. II. 1 is the only one with defective eyes. Mother (I. 3) and her two siblings (I. 1 and 2) all dark brown hair; father (I. 4) dead; he and any of his relations known to II. 1, quite dark. Consanguinity not recorded. (Mr Marcus Gunn.)

Fig. 448. Defective sight with nystagmus, gray irides and light coloured choroids in four out of nine siblings, three ♂, one ♀; four other ♂'s and one ♀ unaffected, although three of these also had light coloured choroids. Refraction of the affected ones; II. 1, aged 22, H. As., degree not stated, V. corrected rather better than $\frac{6}{36}$. II. 2, aged 20, H. As., degree not stated, V. corrected $\frac{6}{18}$; he has lateral movements of head as well as eyes. II. 5, aged 11, mixed As., degree not stated, V. $\frac{6}{24}$. II. 6, aged 9, H. As., degree not stated, V. $\frac{6}{36}$. II. 7, unaffected, aged seven.

The author considers that the condition was not connected with albinism, because the light colouration of the fundus was present in several of those whose sight was quite good. We however include it with some other similar cases for reasons explained in our Chapter on the Albinotic Eye. (McGillivray, Angus, *Ophthalmic Review*, xiv., 260 (1905).)

Fig. 449. Defective sight with blue irides and nystagmus, i.e. imperfect albinism of eyes only, limited to males; hair light in several, reported as dark in others. Descent through the female. I. 2 had very moving eyes and moved his head also. III. 2, 3, 4 and 5, affected sons of II. 2, a daughter of I. 2; hair said to have been dark in all these and also in their sisters III. 6, 8, 9, 10. IV. 3, 4, and 5, three affected sons of III. 6 all with light hair; IV. 6 and 7, two normal sons and four normal daughters. IV. 4, seen at the age of 15, with nystagmus, blue-gray irides, light brown hair, and very poor vision; refraction H., degree not stated; fundus "lighter than is normal even in light-haired people short of albinism." Nystagmus said to have been present immediately after birth. It is not stated that any were examined except IV. 4. Although the author, as the above quotation shows, evidently considered the question of albinism in this pedigree, he dismissed it and recorded the case as "An Illustration of Hereditary Nystagmus." (Lloyd Owen (D.C.), *Ophthalmic Review*, i., p. 239, 1882.)

Fig. 450. Five complete albinos in a sibship of seven, and two others, siblings, in previous generation. IV. 8, aged 65 (1908), intelligent, healthy washerwoman; hair white and plentiful, brows and lashes white; skin blond, no freckles; iris blue, pupil red; constant fine lateral nystagmus; has an illegitimate son (V. 4) dark, who has two children, VI. 1, blue eyes, brown hair, VI. 2, brown eyes and hair. IV. 9, aged 61, intelligent, robust; hair quite white and plentiful, brows and lashes quite white, moustache yellow (he smokes); blond, no freckles, but skin thin and delicate; constant lateral nystagmus; iris blue, pupils small; fundus pale; refraction mixed As., My. vertical, H. horizontal. IV. 6 was similar to IV. 8 and 9, died at 62; had three children (V. 1, 2, 3) all fair, but none albinotic and all died childless. IV. 7, an albino, never strong, died at 14. IV. 10, an albino, was married for 26 years, no children. IV. 5, dark, died a few weeks after marriage. IV. 11, not albino, died at 14, diphtheria. Mother (III. 8), hair yellow, eyes gray, good sight, no nystagmus, a twin. Father (III. 4) died at 80, hair amber coloured. III. 1 and 2, two albino first cousins of III. 4, the fathers (II. 1 and 2) having the same name and being probably brothers; no other details of II. 1 and 2. II. 3, not cousin of her husband II. 2, but no other details. II. 5 and 7 from same place and had same name, probably related, not albinos; I. 1 from same place, no information about his complexion. Of the others, about 25 known as fair, viz., II. 4 (red), III. 7 and 9 to 13, IV. 12 to 21, some of 22, 28 (red), V. 6, 8, 9. Dark about 30, viz., III. 3, 5, 6, 14 to 19, IV. 1 to 4, most of 22, 25, 29, V. 5, 7, 19, 21. A few are described as medium brown. (C. H. Usher, July, 1908.)

Fig. 451. Two albinos in a small pedigree. III. 2, aged 9, complete albino with white hair, red pupils and slow lateral nystagmus; refraction high H. As.; R. H. 3.5 D. horizontal, V. corrected $\frac{6}{60}$, L. H. 4 D. nearly horizontal, V. corrected $\frac{6}{60}$; fundus typically albinotic. Of his siblings, III. 1, aged 11, is fair and has "weak" or "short" sight, but steady eyes and is "not an albino"; the others (III. 3, 4, 5) are dark. Mother (II. 4), fair; she is one of 12; one of her brothers (II. 3) was an albino, another (II. 2) developed cataract before he was 40. The four grandparents (I. 1 to 4) and the father (II. 5) reported to be dark. No known consanguinity. (Mr E. Erskine Henderson.)

Fig. 452. Six albinos in a partially recorded pedigree. II. 1, a young albino girl; no particulars and no statement as to whether she had any siblings. Her parents (I. 1 and 2) were cousins. II. 2 to 6, five albinotic cousins of II. 1, some ♂ some ♀; we are not told whether they were all in one childship. (Mooren, *Fünf Lustren Ophthalmologischer Wirksamkeit*, Chapter xii., p. 294, et seq., Wiesbaden, 1882.)

PLATE XLI. Fig. 453. Eight complete and one partial albino in the grandchildren and great-grandchildren of the same pair. Of the six sibships with albinos: two, IV. 5—8 and IV. 24—29, are the offsprings of first cousins, one, V. 2 of second cousins, and IV. 12—14, IV. 15—19 and IV. 20—23 of unrelated parents. In the first of these sibships, IV. 8, female, aged 19, has snow white hair, red pupils, light blue irides, nystagmus; of her siblings, IV. 5, normal male, aged 26, has light brown hair and light blue eyes; IV. 6 normal, blue eyes, died at six months; IV. 7 normal, light brown hair and blue eyes, died of typhoid fever at nine years. The parents, III. 2 and III. 15, are aged respectively 74 and 64 years, the father was therefore 55 and the mother 45 at the birth of the albino, and they were 48 and 38 at marriage. The father has dark brown hair and blue eyes, the mother, who is nervous, has yellow hair and light blue eyes. The father's elder brother, III. 1, dark hair and blue eyes, is married to a relative and has three normal children, of whom IV. 1 is married but has no children, the second, IV. 2, has three normal children, the third, IV. 3, has married her second cousin and has a single and albinotic boy V. 2. The sister, III. 3, of the father married a non-related husband and has five normal children; the second sister, III. 4, is dead and is presumed to have been normal, she married a first cousin, and had one child, which died as an infant and it is not known whether it was normal or albinotic. The brother, III. 5, fair hair and blue eyes, married also a first cousin, and a normal girl was born to them, which died directly after birth. III. 6 and 7 are both single; they have dark hair and blue eyes. III. 8, the last sibling, married a non-relative and died of puerperal fever, she had dark hair and blue eyes, like III. 6 and 7, she had three children, none of whom are married, IV. 12 fair hair, IV. 13 fair hair, died of diphtheria and the male albino IV. 14. Turning now to the mother of the sibship IV. 5—8, her eldest brother, III. 11, fair hair and blue eyes, married with a non-relative and had five children, the eldest, IV. 15, and the youngest, IV. 19, both male albinos; the three intermediate sisters, IV. 16—18, were normal with dark hair (eyes?). Of the mother's other siblings, III. 12 died single, IV. 13 fair haired is single, IV. 14 a single fair haired male is palsied; of her two younger brothers, III. 16, fair haired, married a non-relative and has four children; the first, IV. 20, has yellow hair, short sight and nystagmus, the second, IV. 21, is dead, but was fair haired as is also the third IV. 22; the youngest boy, IV. 23, is an albino. The youngest of the mother's brothers, III. 17, fair haired, married a first cousin, he has 10 children, of whom IV. 24, were three normal males, two dead, IV. 25 and 26 are twins, one albino and one fair, IV. 27 is a dead albino daughter; the remaining four are normal, one of IV. 28 being dark and the other fair, no record of eyes or hair of IV. 29. Of the four grandparents II. 1 and II. 2 were not related, nor were II. 3 and II. 4, all four had fair hair. II. 2 and II. 3 were, however, sister and brother and one parent of III. 18 was their sibling. Family from Helleberg, Norway. (Dr V. Magnus, Christiania.)

Fig. 454. Seven albinos in a sibship of eight, the father and mother both dark haired, being second cousins through their mothers. All the siblings are dead except two adult albinos, of whom one is married and has normal children. (Distriktslæge Keyser, Risør, Norway, through Dr Magnus.)

Fig. 455. A man married in succession two sisters, his first cousins. By his first wife, I. 2, he had one albino son, now aged 45, and eight normal children all with light reddish hair. By his second wife he had three sons two albinos and one normal, II. 3, with light reddish hair; of the two albinos II. 4 died aged two, and II. 5 died insane aged between 40 and 50. (Distriktslæge J. Heidenreich, Kviteseid, Norway, through Dr Magnus.)

Fig. 456. Four albinos, III. 2, 3, 4 and 8, in a sibship of nine. Of the normal siblings, III. 1 aged 28 has brown hair and blue eyes, is healthy; III. 5, died at nine years of diphtheria, red brown hair and blue eyes; III. 6, aged 20, brown hair and blue eyes; III. 7, aged 18, with same hair and eyes; III. 9, aged 13, with same hair and eyes, bronchitis at nine, suffers now from gastritis. Of the albinos, III. 2, aged 27, has snow white hair, myopia, nystagmus, suffers from headache and vertigo; III. 3, aged 25, hair tinged with yellow when long, myopia, nystagmus, suffers from headache; III. 4, aged 23, snow white hair, myopia, nystagmus, but very strong and healthy; III. 8, aged 15, snow white hair and very myopic, so that he has been to an educational establishment for blind, is, however, very strong and healthy. The father, II. 6, died of paralysis cordis, had dark brown hair but a very fine and pale skin; of his siblings, two of the three brothers II. 1—3 died of pneumonia and the other of an unknown cause, all had brown hair and blue eyes, and their children (*not entered in pedigree*) are all normal with reddish to brown hair. Father's sisters, II. 4—5, dark brown hair, blue eyes, suffer from asthma, single. The mother, II. 7, is unrelated to father; she has light brown hair and blue eyes, very fine and fair complexion which like that of II. 8 and 9 her siblings never gets pigmented in the summer; II. 8 yellow brown hair, blue eyes, epilepsy since 18, married, without children; II. 9, yellow brown hair and blue eyes, scrofulous in childhood, married and all her children have yellowish hair and blue eyes. Paternal grandmother, I. 1, brown hair and blue eyes, died of pneumonia; paternal grandfather, I. 2, reddish hair, blue eyes, died of pneumonia; maternal grandfather, I. 4, brown hair, blue eyes, died at 50 of apoplexia cerebri; maternal grandmother, I. 3, dark brown hair, blue eyes, died at 32 of tumor abdominis. No other cases of albinism known in stock. (Lillehammer, Dr V. Magnus.)

Fig. 457. Three albinos, aged 39, 34 and 30 respectively, in a sibship of six. Of the other siblings: III. 1, aged 43, is dark, he has six children of whom three have red hair; III. 3, aged 36, is dark and has three children, III. 6 died aged 14. The father, II. 1 and mother II. 5 were both dark and first cousins; there is no record of eye-colour. All the father's siblings, II. 2, 3 and 4, had dark hair; nothing known of paternal grandparents. The mother's two sisters are both dark; the elder, II. 6, who is insane, has nine children, all dark, two of them are married and have normal offspring (IV. 3 fair haired, IV. 4 not recorded); the younger, II. 7, is single. The maternal grandparents, I. 1 and 2, were both dark. No other cases of albinism known. (Dr H. Fjeld, Hønefoss, Norway, through Dr Magnus.)

Fig. 458. An albinotic male in a family of five, all of whom are married, and have the offspring shown in the figure, all normal, as are all the other members indicated in the pedigree. (Dr Bretteville-Jensen, Sapsborg, Norway, through Dr Magnus.)

Fig. 459. Full pedigree showing six cases of albinism in two related sibships. In the first sibship: IV. 1, female albino, white hair, tinged with yellow as she grew older, myopia, nystagmus, violet irides, red pupils, died of pneumonia at 18; IV. 2, normal female, aged 39, single, dark brown hair, gray green irides; IV. 3, albino male, aged 38, single, snow white hair, nystagmus, myopia, red pupils, neurasthenic; IV. 4, normal female, aged 36, married, without children, dark brown hair; IV. 5, normal female, aged 33, dark brown hair, suffers from lupus erythematosus; IV. 6, normal female, aged 32, dark brown hair, married, with four dark brown haired children; IV. 7 A, normal male, aged 30, single, dark brown hair; IV. 7 B, normal female, dark brown hair, died at two of convulsions; IV. 8, normal female, aged 27, single (hair?); IV. 9, female albino, myopic, single. The father, III. 1, aged 71, has dark brown hair, and gray blue eyes, healthy, married to his first cousin, III. 17, aged 67, who is "very nervous" and "will not see people." Of the father's brothers and sisters: III. 2 has dark brown hair, is married and has nine normal children, some of whom are married and have normal offspring; III. 4, dead, had dark hair, married, not to a relative, and has four normal children, namely IV. 11, who married a first cousin and has five normal children, IV. 12 and 13, married, both with normal children, number not recorded, IV. 14, married, with six normal children; of these four children, IV. 11, 12, 13 are dark haired, only the daughter, IV. 14, is fair; III. 6, a dark haired sister of the father is married and has 11 normal children, IV. 15, nearly black hair, married with one normal female child V. 7, IV. 16, normal, married her second cousin and has four dark haired children, IV. 17 married and has three normal children; the other eight, IV. 18, all normal are single; III. 8, normal sister of the father, is married and has five normal children, of whom IV. 19, a female with dark brown hair, suffers from paraplegia spastica post myelitis acuta, she is married and has one normal child, the other four IV. 20 are single; the last sister of the father, III. 10, died aged 40, she had four normal children, three of whom, IV. 21—23, are married and have among them ten normal children, the fourth, IV. 24, is unmarried. Ascending to the generation above, the paternal grandparents II. 1 and 2 had respectively brown and dark brown hair, they were not related. Of the paternal grandfather's siblings: the sister, II. 3, was normal, married and had nine dark haired children, of whom III. 12 and 13 both died insane, the latter at 18 years, III. 14 was extremely "nervous," died at 40 and left normal children; III. 15 has had three normal children, III. 16, dead, III. 18 are three unmarried ones, and III. 17 is the very nervous mother of the albinotic siblings; it is thus obvious that the mother springs from a stock strongly tainted with insanity and nerve failure. The mother's maternal uncle, II. 5, married a woman, II. 6, who committed suicide by strangulation and was probably insane, he had two children, of whom the elder, III. 19, was very fair haired, and fair complexioned and highly nervous, he had by a black haired wife seven children, of whom three were albinos; the sibship is as follows: IV. 27, female albino, white hair, nystagmus, dark pupils; IV. 28 A, normal; IV. 28 B, normal, but marked squint; IV. 29 and 30 albino male twins, white hair, nystagmus, but dark pupils, IV. 31 A and 31 B died of diabetes as children¹. The second child, III. 21, of II. 5, is married and had three normal children of whom one, IV. 32, is married and has three dark haired children. II. 8 is the remaining brother of the paternal grandfather of the first albino sibship and has four dark haired children, namely III. 22, a very nervous male who has two normal children, IV. 34 A a female who suffers from spondylitis, and IV. 34 B a male with one normal child; one of III. 23 was a male who died single, III. 24 and 25 normal females married, with three and four dark haired children respectively. There are no other cases of albinism known in the stocks and the consanguineous marriages have been recorded throughout. This pedigree deserves much study and comparison with Fig. 453, from which it differs essentially as showing albinism in a dark stock, as compared with a fair blue eyed stock. We may regret that the record of eye-colour has not been taken. (Kragerö, Norway, Dr Magnus.)

Fig. 460. A pedigree of the *Storelunde Slaegte* showing albinism in three successive generations with much cousin marriage. II. 2 (O. S.) married III. 3 (E. K.), who is said not to have been related to him, but there may have been very distant kinship. II. 2's parents, I. 1 and 2, were, however, first cousins. III. 2 (O. O. S.), the eldest son, obtained the family farm on the death of his father; III. 3 emigrated to America; III. 4, a boy, died, and the five girls were married to different yeomen of the district; III. 7 have left large families, in none of which has albinism appeared. III. 2 married his second cousin (S. G.) and they had five children, namely: IV. 1 an albino, who died aged two; IV. 2 who married her first cousin IV. 8 (H. Sa.)

¹ Descent lines from III. 19 and 20 omitted by engraver.

and of whom a record is given below; IV. 3, who married a non-relative, IV. 11 (P. Sy.), in whose stock (III. 8, IV. 10—13, V. 18 and 19 and VI. 17) no albinism appears; IV. 4, who married IV. 5 (A. Sy. a man of the same name—?brother—of the husband of IV. 3) and had seven normal children V. 1; and lastly the female albino IV. 6 (A. O. St.), living, aged 65, she has snow white hair and eyelashes, red pupils with good reactions, light blue irides, photophobia and nystagmus, good colour sense, and always healthy. On the failure of male heirs, the farm passed to IV. 2, married to her paternal aunt's son IV. 8 (H. Sa.). They had nine children, V. 2 A died of phthisis at 22, single; V. 2 B died at four of measles; V. 3 (I. H. St.)¹, who married his first cousin V. 11, is present owner of the farm and father of an albinotic sibship; V. 4, married to an Sa. (probably a relative of the III. 6 stock), but none of her descendants, VI. 1, are albinotic; V. 5, married, has many normal children VI. 2; V. 6, albino, died at one year; V. 7 single female, and V. 8 and 9 twins, who died a few days old, and of whom it is not known whether they were or were not albinotic. The present proprietor of the farm, V. 3, is dark, his wife and cousin, V. 11, is lighter, intellectually he is not well endowed and of his children this is generally the case in a still higher degree. VI. 3 male, dark blond, good sight and colour sense, dull; VI. 4, three girls of whom the first and third are dark blond and the second fair haired. VI. 5, albino, white hair, eyebrows and lashes, the irides white or blue white, pupils dark, marked blepharospasm and nystagmus, bad sight, fairly good colour sense, aged 15, but she does not know her own age, she stammers and talks with a snuffle, is intractable and touchy, and her teacher reports that "she is as nearly as possible an idiot"; VI. 6, fair haired boy; VI. 7, fair haired girl with blue eyes; VI. 8 fair haired boy, aged 11; VI. 9, male albino, aged 10, snow white hair, bluish white irides, red pupils, bad sight and nystagmus; VI. 10, male albino aged 8, and described in same terms; VI. 11, normal girl, hair and eyes not recorded. We now turn to the family of the mother, V. 11. Her parents, IV. 3 (M. St.), and IV. 11 (P. Sy.), were not related, they had 15 children, of whom 10, namely V. 10, 15 and 17 died early, mostly a few days old; it is reported that the doctors attributed it to "kolike-sjue" inherited by the children, but the cause is not known. Of the mother's (V. 11) other siblings: V. 12, married with an unrelated husband, has eight normal children, VI. 12; V. 13 and V. 14, a brother and sister, have both married their first cousins and have each a single normal child; V. 16, a fair haired woman, had an illegitimate albinotic daughter by a "distant kinsman" before marriage, this daughter, VI. 15, is now aged 15, she is a lively and intelligent girl, but a typical albino; V. 16 was afterwards married to her second cousin, by whom she has two normal sons. (Dr Ree, Vinstra, Norway, examined by Dr Magnus.)

Fig. 461. Two albinos in a sibship of seven. II. 2 is a workman aged 38, and II. 1 his sister aged 32; no details except that one sibling is married and has three children, two living and one dead. No other cases of albinism known in the family. (Dr Johnsen, Dröbak, Norway, through Dr Magnus.)

Fig. 462. Two albinotic sisters in a sibship of five. One of the sisters, II. 4, is married and has six normal children; the three brothers, II. 1—3, are all dark haired. No other cases known in family. Origin, Laurvik. (Dr Hübert, Christiania, examined by Dr Magnus.)

Fig. 463. Two unrelated parents, both with fair hair and blue eyes, have two children only, both albinotic sons. No case of albinism known to have occurred in either husband's or wife's stocks. Origin, Sandökedal. (Prest Hans Ström, Sandökedal, Norway, through Dr Magnus.)

Fig. 464. III. 1 is an albino aged 74; he has four normal children and six normal grandchildren. There was no consanguinity between his parents or his grandparents; no other case known in family. No record given of his siblings, or other details. (Dr P. Berg, Grimstad, Norway, through Dr Magnus.)

PLATE XLII. Fig. 465. Four albinos in three sibships of the fourth, and one in a sibship of the first recorded generation. The albinotic girl (IV. 1) has four normal siblings, one dead; her father and mother were not related; her mother (III. 1) was the illegitimate daughter of II. 2, one of 12 normal children, the offspring of a man (I. 2) whose sister was the albino, I. 3. The father (III. 2) of the albino, IV. 1, is light haired, while the mother (III. 1) is dark; there is no known case of albinism in the father's stock. (Distriktlaege Keyser, Resör.) From a brother of the albino, I. 3, i.e. a great-great uncle of IV. 1, are descended three albino great-grandchildren. We have first the two albinos (IV. 9 and 11) in a sibship of five. The eldest sibling, aged 39 (IV. 8), is married and has three normal children; IV. 10, aged 34, and IV. 12 are single, and neither the male albino nor his sister are married. Their parents were not related and have both dark hair. The mother's elder sister (III. 4) is married to a non-relative and has five normal children, the eldest (IV. 3) a female who died of tuberculosis. IV. 4 has one normal child, IV. 5 is single, and IV. 6 and 7 have normal offspring. The younger sister (III. 8), married to a non-relative, has seven children, one of whom, IV. 13, died at seven years and was a male albino. IV. 14 died at 21 of an accident. IV. 15 and 16 are both married, but without children. IV. 17, married to a non-relative, has one normal child; the two remaining daughters, also married to non-relatives, have each two normal children. The brother (III. 10) died young, and the youngest brother (III. 11) has had three normal children, one of whom died of tuberculosis. The mother and father (II. 6 and 7) of

¹ Surname is that of the family farm and not the Sa. of his father.

the sibship (III. 4, 6, 8, 10, 11) were unrelated. (Dr S. Erichsen, Tvedestrand, Norway, through Dr Magnus.)

Fig. 466. Three albinos in a sibship of seven. IV. 2, a male albino, aged 23; IV. 3, male albino, aged 22, and IV. 8, male albino, aged eight; the intervening daughter (IV. 4), and the three sons (IV. 5—7) are merely reported as "normally pigmented." The father (III. 4), aged 47, is very fair haired, white eyebrows, blue gray eyes and defective sight; he "squints"; he has been entered as a semi-albino. His wife (III. 5), with whom he is not related, has black hair and is aged 44. Of the father's sibship, four siblings, III. 3, are dead, the two eldest of these as infants, the third as a child, and the fourth, aged 16, in a lunatic asylum. III. 1 is 44 years old, he has nearly white hair and eyebrows and blue eyes, but good sight, he has three normal children; the other brother (III. 2) is unmarried and paralysed. Of the mother's nine siblings, four are dead and only one, III. 8, is married, with four normal children. Of the four grandparents, II. 1 and II. 3 were fair haired and not related to their wives. The mother of II. 1 had three siblings, and two of these are stated to have had "white hair, and weak nearly white eyes." (Prest Hans Ström, Sandökedal, Norway, through Dr Magnus.)

Fig. 467. Two unrelated parents (II. 2 and II. 14) had two albinotic children, a boy (III. 5) living, and a girl (III. 6) who died of diabetes, no siblings. The four grandparents (I. 2 A and I. 2 B and I. 3 and I. 4) were not related. The father's two brothers II. 15 and II. 17 are both married and have respectively seven and two normal children. Of the mother's siblings, the sisters (II. 3 and II. 5) are married and have each two normal children. The brother (II. 7) has three normal children; the brother (II. 9) has three children, of whom two are normal, but one, a girl, has albinotic eyes, but light brown hair; the remaining brother has normal children, number not stated. The two albinos (III. 5 and 6) have an albino second cousin (III. 4), but it is not recorded whether the link is through III. 5's maternal grandfather I. 2 A or grandmother I. 2 B. This albino second cousin (III. 4) married a non-relative (III. 3) and had three normal children, a son and two daughters. The two daughters (IV. 5 and IV. 7), both married, have respectively four and one normal offspring. The son (IV. 4) married a kinswoman (IV. 1) related in the fourth or fifth degree, and had three daughters, the eldest of whom (V. 3) is an albino, the other two being normal. The parents of the mother (III. 1 and 2) were normal, and the mother had a brother (IV. 2) with seven, and a sister (IV. 3) with six normal children. (Dr Bryhni, Börsen, Norway, through Dr Magnus.)

Fig. 468. Pedigree of the *Øyreslaegt*. In a sibship of four, there have been two albinos, III. 3, a brother living, and III. 4 a sister, who died of phthisis. The father (II. 4), and the mother (II. 7), both dark haired, are distantly related. The brothers and sisters of the parents are also dark haired; the mother has one brother (II. 8) an idiot. Known normal relatives given on figure. Eye-colours not recorded. (Ingeniör J. Magnus, Svelvik, Norway, examined by Dr Magnus.)

Fig. 469. An extensive pedigree with much consanguineous marriage, showing albinism in three members of a sibship of six only. The father (III. 4), aged 50, has dark brown hair, he married in succession two sisters, III. 21 and III. 22, with whom there was some kinship. By his first wife (III. 21) he had IV. 2 only, a girl with brown hair and blue eyes; by his second wife (III. 22), a woman with brown hair and blue eyes, he had IV. 3, a male albino, aged 14, very myopic; IV. 4, a male albino, aged 12; IV. 5, a male albino, who died at three years; IV. 6, a normal female with brown hair and "yellow" irides; IV. 7 a normal male with fair hair and blue irides, who died at four years, and IV. 8, a female, with brown hair and blue eyes. The father's brothers and sisters all married non-consanguineously with the exception of III. 7 who is single; they have among them 18 normal children, distributed as indicated in the pedigree. Of the mother's siblings, the two brothers (III. 18 and 19) made consanguineous marriages and have each seven normal children; III. 20 is dead; III. 23, married to a non-relative, has three normal children, and III. 24, just married, has yet no children. The paternal grandparents (II. 3 and 4) were kinsfolk, degree not stated; the paternal grandfather had a sister and brother (II. 1 and 2) who emigrated and cannot be followed. The offspring of paternal grandmother's brothers and sisters (II. 5 to 11) number 34 (III. 8—14), distributed in the manner indicated in the pedigree; no record is given of the consanguinity of these marriages. The maternal grandfather and grandmother (II. 17 and 18) were also kinsfolk, degree not stated; their siblings (II. 12—16, II. 19—24) were all normal, and mostly married (nature of marriages not given), the offspring, 48 in number (III. 15—17 and III. 25—28), are distributed in the manner indicated in the diagram, all being normal. Of the eight great-grandparents, three pairs were consanguineous, there being two third cousin and one second cousin marriage, only the mother's maternal grandparents (I. 7 and 8) were unrelated. Thus we see that of the immediate seven ancestral marriages six were consanguineous, but only in the last generation has albinism appeared. The stocks of both father and mother of the albino sibship are reported as very strong people, one could lift 570 kilos, another stronger than a horse, and they are spoken of as "giants." At the same time they are described as very intelligent people. (Dr Vangnaes, Rosendal Hardanger, Norway, through Dr Magnus.)

Fig. 470. One albino boy (IV. 2) in a sibship of five, the offspring of a man (II. 4) who married his sister's daughter (III. 4). IV. 2 has nystagmus, and mixed astigmatism, -3 D. in vertical, and $+5$ D. in horizontal meridian. II. 4, aged 40, is "black as a Spaniard," and III. 4, aged 25, a dark blond. Known relatives, normal as indicated in pedigree; no further details. (Dr Johan Borthen, Bergen¹, Norway, through Dr Magnus.)

Fig. 471. Two albinotic children in a sibship of four, the offspring of non-consanguineous parents. III. 4, albinotic girl, aged 13; III. 5, normal boy, died, aged 11; III. 6, normal boy, living, aged 8; III. 7, albinotic girl, aged five. The father (II. 5), aged 49, has black hair and gray blue eyes; the mother (II. 9), aged also 49, has dark brown hair and blue eyes. The marriages of the grandparents were not consanguineous, and the relations as far as known are recorded on the pedigree, no other case of albinism occurring. (Dr Lyche, Frederikstad, Norway, through Dr Magnus.)

Fig. 472. Two albinos in a sibship of three. III. 3, aged 39, single; his albinotic brother (III. 5) died January, 1908, of ascites; the married sister (III. 4) has six normal offspring. The parents (II. 3 and 4) unrelated, and there was no grandparental consanguineous marriage. The siblings of the parents and their offspring are indicated on the diagram, there being no other albinos known. (Dr Oscar Bache Ullefos, Norway, through Dr Magnus.)

Fig. 473. Two cases of albinism in the last two members of a sibship of eight. The parents were non-consanguineous. I. 1 died from accident, aged 52, he had light brown hair and blue eyes; the mother, I. 2, said to have had black hair, died from senile decay at 84. Of the siblings: II. 1 died, aged 2—3, from meningitis following scarlatina; II. 2 died in infancy; II. 3 died, aged eight; II. 4 died, aged five; II. 5, now aged 58, by trade an engraver, light haired, has been married four times; by his first wife he had three children of whom two died of rickets and diphtheria and the third is a light-haired boy; no offspring by his other three wives; II. 6 living, single, aged 56, since 16 infirm, nervous, strumous, suffers from insomnia and melancholia; II. 7, aged 51, by trade a baker, snow-white hair, gray irides and red pupils, nystagmus, married, but without offspring; II. 8, aged 47, maidservant, snow-white hair, gray irides with red pupils, vertical and horizontal nystagmus; skin grows red but never tans with sun. She was examined by Dr V. Magnus and had never heard of other cases of albinism in the family, but appeared to know little about it, or to be very reticent. (Dr Heimbeck, Christiania, Norway, through Dr Magnus.)

Fig. 474. One albino in a sibship of ten, the offspring of first cousins, and of normal grandparents with non-consanguineous marriages. The siblings of the grandparents, and of the parents are given in the diagram and are all normal. Of the siblings of the albino: two brothers (III. 4) are dead; two sisters were stillborn and one is dead (III. 5); three brothers (III. 2) have made non-consanguineous marriages and have seven normal children in all. (Dr Oscar Bache, Ullefos, Norway, through Dr Magnus.)

Fig. 475. A man married his sister's daughter and had four children, of which the first, III. 1, was an albino and died as a child; the three later born were normal. (Dr Welhaven, Grimstad, Norway, through Dr Magnus.)

Fig. 476. II. 1 is an albino woman, aged 72, with a single child, a normal daughter (III. 1). The father, I. 1, married twice and by the second wife had five normal children and thirteen normal grandchildren. The pedigree, completed as far as possible, shows no other cases of albinism. (Distriktslaege P. Backer, Kabelvaag, Norway, through Dr Magnus.)

Fig. 477. An albino, aged 60, the only child of normal dark haired parents (no record of consanguinity). He has grown-up children, all normal, no record of number. (Distriktslaege Kolbjornsen, Hadeland and Land, Norway, through Dr Magnus.)

Fig. 478. An albino girl (II. 2), aged 16, myopia and nystagmus, in a sibship of three; II. 3, a brother, aged 12, has fair hair and "blue brown" eyes; II. 1 a sister, aged 18, has dark hair and brown eyes, and is recorded as of doubtful legitimacy, but it is not said whether born to same father before marriage, or of a different father. The father and mother are fair haired, but there is no record of consanguinity. (Distriktslaege G. Heidenreich, Kviteseid, Norway, through Dr Magnus.)

Fig. 478 B. An albino girl has an only brother who is an idiot, nearly blind, squints, and has "green-blue-brown irides," and brown hair. (Distriktslaege Chr. Paus², Valle, Saetersdalen, Norway, through Dr Magnus.)

PLATE XLIII. Fig. 479. Two albinos (III. 8 and 10) in a sibship of eight, both with red pupils and white hair, aged 38 and 33 respectively. III. 8 is married and has one normal child. One of the two (III. 13) died, aged $3\frac{1}{2}$, the other is now aged 21, the eldest of the sibship (III. 7) is 41, and has two normal

¹ Three or four other cases of albinism are said to exist in Bergen.

² Dr Paus also reports two albino girls in a family, one aged 13, white hair, some blue in iris, and very photophobic. No further details.

children. All the normal members of this sibship have blue eyes and red hair. The four grandparents, their children and their grandchildren are indicated on the pedigree and were all normal except III. 8 and 10. The paternal grandmother (I. 2) of this pedigree was half-sister to the paternal grandfather (I. 1) of Pedigree 480. II. 8 and 9 are first cousins, and I. 3 and 4 were also cousins in some degree. (Dr Voss, Lyngör, Norway, through Dr Magnus, Christiania.)

Fig. 480. A single albino, aged 12 (III. 5), in a sibship of six, white hair, blue irides, red pupils; there is albinism, however, in paternal grandfather's half-sister's descendants (see Fig. 479). Of III. 5's siblings: III. 3, female, aged 20, has dark blue eyes and dark brown hair; III. 4 and III. 7, aged 15 and 8, have blue eyes and brown hair; III. 6, aged 11, has dark blue eyes and black hair; III. 8, aged five, has light blue eyes and yellow hair. The father (II. 3) and the mother (II. 4) are unrelated and have both blue eyes and brown hair. The four grandparents were unrelated and all their descendants are normal except III. 5. The only albinos known to be related are the half second cousins (III. 8 and 9) of Fig. 479. (Dr Voss, Lyngör, Norway, through Dr Magnus, Christiania.)

Fig. 481. The complete albino (II. 1) has a sister (II. 2) with photophobia and nystagmus, and two normal brothers. No other details. (Dr Chr. Paus, Saetersdalen, Norway, through Dr Magnus of Christiania.)

Fig. 482. A single albinotic girl (III. 6), aged 15, in a sibship of nine. III. 2, male, aged 23; III. 3, male, aged 21; III. 4, female, died, aged eight; III. 5, male, died aged eight; III. 7, male, aged 12, blind with cataract; III. 8, male, aged eight; III. 9, male, aged six, and III. 10, female, aged 1½. Father (II. 3), aged 58, and mother (II. 8), aged 43, are first cousins. The father had six sisters, of whom three died at 25 or less; they were all normal and one had seven normal children. The mother had four brothers, two of whom have respectively two and six offspring; they and their offspring are all normal. Which of the four grandparents (I. 1—4) were siblings has not been recorded. (Dr Chr. Paus, Saetersdalen, Norway, through Dr Magnus, Christiania.)

Fig. 483. Four complete albinos in four sibships of three generations and two doubtful in another sibship. III. 3, man (Abuh Samat), aged 32 (1908), seen; well formed and intelligent Malay; hair sandy coloured, eyebrows fair; skin white, not freckled, but sunburnt on back of neck, hands and feet; iris pale blue in outer two-thirds, inner third rusty coloured; photophobia; nystagmus; refraction My.; fundus not particularly pale, but choroidal vessels distinctly visible. Three others in same sibship, III. 1, 2 and 4, aged 40, 38 and 27 respectively, not albinos. Father (II. 9) normal, has an albino brother (II. 8), not seen. Mother (II. 2), normal. Grandmother (I. 3), not white, had a brother (I. 1) and sister (I. 2), now dead, stated to have been albinos, both unmarried. Grandfather (I. 4), not albinotic. II. 13, man (Alang Codin), aged 36 (1908), seen, not very robust, but an industrious gardener; hair of head shaven, but a slight growth is fair, brows and lashes fair, on chin and upper lip slight growth of dark-coloured hair; skin white, not freckled, but sunburnt on exposed parts as legs, chest and neck; iris blue; photophobia; nystagmus; refraction H.; fundus not pale, but choroidal vessels distinctly visible. Is married, wife (II. 17) not albinotic, has three children (III. 5, 6 and 7), none albinos. Is first cousin to the albino (II. 8) who is uncle of albino III. 3. Father (I. 7) has a sister (I. 5), albino, not seen; no further information about her or her other brothers (I. 6) except that they were not albinos. Photograph sent. Kuala Kangsar. (Dr Fraser, through C. H. Usher, July, 1908.)

Fig. 484. Three complete albinos in a sibship of eight, with five doubtful albinos in three previous generations. V. 1, female, aged 15 (1908), physical condition excellent, menstruates regularly, mental faculties good; hair particularly silky and pure white; skin not freckled, no pigmented spots, slight ichthyosis always present; lateral nystagmus; pink iris with tinge of blue, book held close when reading. V. 3 and 5, females, aged 11 and 7 respectively, in good physical condition, hair same as V. 1, also skin except that it is smooth; lateral nystagmus, iris pink with blue tinge, mental faculties good. V. 2, 4, 6, 7 have blue gray eyes (V. 2, slight strabismus), V. 8, aged 3½, very dark eyes—all fair hair. The father (IV. 2), aged 38, has dark hair and blue eyes and is one of a sibship of 13, none of them albinotic. His grandfather (II. 2) had a very large family all normal, but he had a brother (II. 1), reported to be very fair. The mother (IV. 3), aged 26, has dark hair and blue eyes, she was one of a sibship of eight, of whom a sister (IV. 4) has a congenital lock of white hair. The maternal grandparents (III. 7 and III. 13) were both members of sibships of eight. A cousin of the maternal grandfather, III. 7, namely III. 10, who is very dark, has a son (IV. 9) who has white hair, and blue eyes, without nystagmus. Two cousins (III. 11 and 12) of the maternal grandfather, probably offspring of II. 7, used to attract attention by the lightness of their hair; they died early and it is not possible to say now whether they were certainly albinos. Fifeshire. (Dr A. G. Carment.)

Fig. 485. Three albinos in two sibships of same generation. IV. 2, female albino (Loraina from Vitogo), seen; hair light yellow. Is married; had two normal children (V. 1 and 2) both dead. IV. 4, male, died in infancy, was albino, not seen. Father (III. 1), a normal Fijian; his wife came from a different village. IV. 8, female albino (Neirou), seen, is dumb; married, had three children (V. 5, 6 and 7), all normal; V. 6 is dead. Mother of IV. 8, the wife of III. 4, was from same village as father (III. 4), but

of different Matagali. She had two brothers; one had no children, and the children of the other (normal) are all dead. Wife of I. 1 from same village, but of different Matagali from husband. II. 1's wife from village at some distance. II. 2's wife from same village as himself, but of a different Matagali. III. 1 and 2 from different villages. III. 3 was informant. There is no evidence of cousin marriage. Two albinos (brother and sister) said to have been at Naveiyago, a village alongside Vitogo, some thirty years ago. (Mr K. A. Allardyce, through C. H. Usher, July, 1908.)

Fig. 486. Probably a case of partial albinism and another in same sibship, not seen. III. 3, man (Murugasoo), aged 18 (1908), seen at Kuala Lumpur, a Tamil from Batticotta, Jaffna, Ceylon, unmarried, skin little different from normal Tamil, face rather less pigmented than rest of body, no freckles; hair and eyebrows reddish-brown, hair on nape of neck fair, slight growth of fair hair on chin and upper lip; nystagmus; iris hazel; no photophobia; refraction H.; fundus, choroidal vessels not visible. No information as to visual acuity or colour of hair in childhood, therefore not certainly partial albinism. III. 2, his sister, said to present similar conditions, married III. 1, not albino, has normal child IV. 1. Father (II. 5) and mother (II. 1), normally pigmented, believed to be first cousins, and children of brother (I. 2) and sister (I. 1) respectively. Photograph sent. (Dr H. Fraser, through C. H. Usher, Aug. 1908.)

Fig. 487. Three albinos in a sibship believed to have numbered eight, the offspring of a man who married his sister's daughter. III. 1 and 2 are complete albinos, pink pupils and profuse white hair; they sing and play well and conduct a school; III. 6 and 7 suffer from "extreme" myopia but are blue-eyed blonds, not albinos. Details of the rest of the sibship, all dead, difficult to obtain, as the family is extremely reticent on the subject; III. 3 is said to have been born deformed and died from this deformity. III. 5 is reported as another albino dying in infancy. In addition two children are spoken of as "extremely" myopic and dying in infancy. It is not, however, certain that III. 5 was not one of III. 4. The father (I. 2) was a blue-eyed blond and died of brain-disease; the mother (II. 1) is moderately dark with brown eyes. Hessian family. (Karl Pearson.)

Fig. 488. Two not quite full albinos in a sibship of four. III. 2, aged 21, hair yellowish white, eyebrows quite white; sight defective, photophobia and nystagmus, pupils look dark, except when much light falls upon them without accommodation; the elder brother (III. 1) is also albinotic, but in a less marked degree; both have grown darker with age. III. 3, aged 19, and III. 4, aged 7, are normal. The mother (II. 2) had one sibling, an albinotic brother; I. 2 was normal, but I. 1, her first cousin, died before III. 2's knowledge and he does not know anything about his appearance¹. (Dr S. Matthiasson, Iceland.)

Fig. 489. Two complete albinos in a sibship of three; white skin and hair, pink pupils. The younger brother (III. 3) quite free from albinism. On the father's side there is no trace of albinism, but a maternal uncle was completely albinotic. The family springs from the district of Dinajpur, India. III. 1 was a student in the Arabic Department of the Madrasah, Calcutta. (K. Pearson.)

Fig. 490. II. 2, an albino of complete characters in the Anglo-Persian Department of the Madrasah, Calcutta; he has two completely albinotic sisters (II. 3 and 4), but a normal elder brother (II. 1). His parents are normal; nothing further known of the ancestry on either side. Origin of family, Diganga in the 24 Purgannas. (K. Pearson.)

Fig. 491. This is Rizzoli's case of the inheritance of a white lock of hair on the forehead. It is introduced here to show that partial albinism of the hair is inherited. (Rizzoli, *Bulletino delle scienze mediche di Bologna*, 1877, Ser. v., Vol. 23. It has been reproduced by W. Stricker, Virchow's *Archiv*, Bd. 73, S. 623. Our pedigree is from a MS. copy of Rizzoli's paper most kindly provided by Prof. C. Reymond of Turin. It does not agree with the version recently published by Dr Gossage, *Journal of Experimental Medicine*, Vol. i. Part i.)

Fig. 492. Case of incomplete albinism. IV. 5, girl, seen, aged 10 (1908), with mental defect; hair and eyebrows light brown, eyelashes darker; skin blond; a few freckles; iris blue; nystagmus lateral, not constant; red in pupils only when dilated; refraction result obtained by retinoscopy almost identical with that obtained in June 1906, R. My. 8 D. horizontal meridian, 12 D. vertical meridian; L. My. 10 D. horizontal meridian, 13 D. vertical meridian, V. not obtainable owing to mental condition, counts fingers four metres; fundus uniformly exceedingly pale except at usual dark circular patch at macula; in left fundus is a smaller circular dark area behind inferior temporal vessels of same colour as macular dark patch; no myopic crescent; no choroidal atrophy. Mother (III. 8), hair brown; iris blue; married at age 28, eight years before (IV. 5) her only child was born, no miscarriages. Father (III. 2) married at 29, hair dark; II. 4, maternal grandfather, dark; maternal grandmother, II. 5, fair, not albino; II. 1, an only child, hair dark, eyebrows fair; II. 2, dark; I. 1, fair?; I. 2, dark; I. 3, dark; I. 4, name only known; III. 1, married, no issue, hair dark; III. 3 and 4 generally dark, their offspring (IV. 1, 2, 3 and 4) all dark except one male child in IV. 2 with very fair hair and blue eyes; III. 6, and offspring (IV. 6 and 7)

¹ I am in possession of some details about another Icelandic albino, but I have not so far been able to trace his family history. K. P.

all dark; III. 7, hair brown, eyes blue, has a very fair haired child with blue eyes (IV. 8), the two other offspring being dark; III. 9, hair light yellow, eyes blue, has two offspring with fair hair and blue eyes in sibship of six (IV. 9 and 10), others dark; II. 3, a number of males and females generally dark, no fair sibs known amongst their several families (III. 5); II. 7, 8 and 9 are mostly dark; III. 10, dark; III. 11, some fair, one female seen, hair light brown, iris blue; III. 12, three sibships, one male very fair and vision defective (?albino). (C. H. Usher.)

PLATE XLIV. Fig. 493. II. 2 had albino offspring by two totally unrelated husbands, II. 1 and II. 3, to neither of whom was she herself in any way related. III. 5, aged 70 years, is a Baptist minister; hair and skin have always been perfectly white; he has marked nystagmus, photophobia and astigmatism; the irides are light blue; the ophthalmological report is: "almost albino, refraction R.: H. 4 D. V. corrected $\frac{5}{18}$ nearly; L. H. astig. 7 D. horizontal, 5 D. vertical, V. same as R., lenses clear; no note of fundus or colour of irides, but latter probably not translucent." Could hardly open his eyes at all in the sun when young, but can bear the light better now; can only read with one eye at a time. II. 6 was an albino girl who died aged two years. III. 7 and 8 are normal brothers, both of whom have had normal families. III. 5 is married and has six normal children, the youngest, IV. 7, being herself married and having a normal child. By her first husband, II. 1, II. 2 had four children, III. 1, an albino boy who lived to be 12 years, a boy, III. 2A, who died as an infant, and III. 2 and 3 two daughters, who have married, went to America and have normal families. II. 2 had normal sisters who went also to America and are believed to have normal families. The stock is largely dead or scattered abroad so that further details were not procurable. II. 2's eyes were, it is said, dark, and II. 3's light blue. No albinos other than those recorded have been heard of in the stocks of II. 1, II. 3 or the mother, II. 2, whose bearing of albinos to a second husband unrelated to the first has been locally attributed to "telegony." (Dr R. McNeill.)

Fig. 494. Four albinos in two sibships of same generation. II. 1, man (Kala), native Hawaiian, living in island of Hawaii, an albino; not robust looking, walks with a weak-kneed slouch, however can walk long distances and says he is well and strong. No other particulars, except that he has no child. II. 3, albino brother of II. 1, is well and strong; has one child (III. 1), dark skinned. II. 4, sister of II. 1 and 3, an albino, dead. II. 6, female, albino, moved to another island and was lost sight of; her mother (I. 3), a normal native, is sister of I. 2, the dark-skinned mother of albinos II. 1, 3 and 4. I. 1, a normal native, father of albinos II. 1, 3 and 4. II. 5, eight siblings, none albinos (sex not given) in same sibship as the three albinos II. 1, 3 and 4. (Mr John Grace, F.R.C.S., Hilo, Hawaiian Islands.)

Fig. 495. Four albinos in a sibship of six. V. 6, aged 11 years, complete albino, blue irides, red pupils, and some nystagmus, white hair (see Plate O). V. 7, aged nine, hair and eyes the same as her elder sister, but marked nystagmus, reads with the lines of her book vertical (see Plate O), suffered from rickets as a young child. V. 8, aged seven, normal, blue eyes, brownish hair. V. 9 died of rickets, aged 16 months. V. 10, aged three years, complete albino, much nystagmus, rickets. V. 11, aged nine months, healthy male baby, dark blue eyes and brownish hair. The father, IV. 4, aged 40, dark brown hair and dark blue eyes; the mother, IV. 6, aged 33, not related to him, has light blue eyes, light brown hair, and is very delicate. The paternal grandfather, III. 2, married twice and died at 67; by his first wife, III. 1, he had one normal son, IV. 1, aged 50, who has four children, V. 4, all normal; by his second wife, III. 3, the paternal grandmother of the albinos, who also died aged 67, he had four normal sons, IV. 2, 3, 4 and 5. The eldest, IV. 2, aged 48, has seven normal children, the second, IV. 3, aged 44, is married but without children; the third, IV. 4, is father of the albinos, and the fourth, IV. 5, aged 38, normal, is father of three normal children, V. 4 and 5. The maternal grandmother, III. 6, still living, aged 65, has married twice; first with III. 7, by whom she had three children, IV. 7, now aged 48, single and in America; IV. 8, died single at 24, and IV. 9, died at four years with rickets, all these were normal. Secondly III. 6 married III. 5, an alcoholic and "ödeland" from whom she was divorced; there were no known albinos in his stock; her only daughter by this marriage was the mother, IV. 6, of the albinos. III. 6 had six siblings, three, III. 4, died of infantile diseases, one, III. 8, has 11 normal children, a younger sister, III. 9, is without children, and the youngest sister, III. 10, has four children, of whom one, IV. 11, a woman of 28, is insane. III. 6 knew her parents, II. 2 and 3, and her four grandparents, I. 1, 2, 3 and 4, all were normal and throughout there were no consanguineous marriages. (Dr L. Harboe, Hamar, Norway, through Dr W. Magnus, Christiania.)

Fig. 496. Two partial albinos, eyes only, out of nine of ages between 24 and nine. III. 21, aged 16 (1907), irides blue, fundi quite albinotic, refraction myopic, sight defective (exact refraction and vision not recorded), nystagmus; hair and eyelashes dark. III. 18, aged 20, irides blue, fundi quite albinotic, nystagmus, no note of V. or refraction. Of their seven siblings, not one has brown eyes; III. 16 and 22 have brown hair and eyelashes; eyes blue in 16, 17, 20, gray in 22 and 24; hair and eyelashes fair in 17, 20, 24. Mother (II. 10), aged 51, blue eyes, brown hair. Father

(II. 6), aged 60, gray eyes, brown hair and eyelashes, said to have nystagmus, but no record of his sight. III. 7, aged seven, gray eyes, *very* fair hair and lashes, no note of his sight. I. 2 reported to have been highly myopic. Hair- and eye-colour of others; eyes marked as blue, or gray in every member of the pedigree (gray 11, blue 31, dark blue 1): hair fair in 32, viz. all except I. 4 and II. 9, both of whom had black hair; I. 1, 2, 3; II. 3, 11; III. 13, all brown. No consanguineous marriages. In Gen. III. twenty-four are living, of ages between 2 and 24, only four of them being below 10; in the great majority of those marked as fair-haired the fairness is therefore likely to be permanent. (Dr Schoute, Amsterdam.)

Fig. 497. One partial albino in a sibship of eight. IV. 10, seen, aged five (1908), illiterate; hair, eyebrows and lashes light yellow red; skin blond, a few freckles on nose; iris light, nearly uniform yellow-green; constant lateral nystagmus; refraction R. H. 1.5 D. vertical meridian, 4 D. horizontal meridian, V. corrected recognises small objects, keys and coins, at three metres; L. H. .5 D. vertical meridian, 3.5 D. horizontal meridian, V. corrected same as R.; the astigmatism is corneal, as shewn by ophthalmometer, fundus pale, choroidal vessels visible; child delicate in infancy, nothing abnormal found by physician at present time; never had fits, but "screched in infancy." Mother (III. 8), hair dark brown, but white when a child; eyes always brown, her dark eyes with fair hair often commented upon; fundus not pale. Father (III. 2), hair dark brown, eyes hazel; II. 9 dark; II. 10 dark; I. 4 very dark; I. 5 very fair, no nystagmus, could read with spectacles; II. 2 dark; II. 5 hair reddish, blue eyes, good vision; I. 1 and 2 dark; IV. 5 and 9 hair light red; IV. 4, 6, 7, 8 and 11 hair brown, different shades, eyes brown; IV. 5 eyes blue; V. 1 hair light brown, eyes dark; III. 3 and 4 hair brown; III. 5 fair hair; III. 11 hair lighter than IV. 10, skin blond, vision defective, wears glasses; IV. 1, 2 and 3 are families of young children, none albinos; III. 1, hair-colour of this family not known; III. 6, one male with red hair, no information as to the others; II. 8, hair dark and red respectively, both of their families (III. 7) abroad, no information; III. 9 and 10 brown hair, fair in childhood, eyes blue, the former died, had child (IV. 12), no information; III. 14, most have brown hair, one dark red; II. 3, 4, 6 and 7 hair brown; I. 6 gray when seen, not albino. II. 1, no information. (C. H. Usher, 1908.)

Fig. 498. Two complete albinos in a sibship of five. III. 5, aged 16 (1908), undergrown and looks only 14, but is sharp; sight so poor that he was not taught to read at school. Hair of palest straw colour and was the same at birth, brows and lashes even paler but not quite white; skin very fair, but he says it does not burn more than that of other boys when he works in the fields with sleeves rolled up; irides pale blue with some darker slaty patches near periphery, this darker tint being due to thinness not to pigment in the iris; they are not translucent to light of candle reflected from ophthalmoscope; the pupils however are dull red in some positions (no lamp available); fundi fair, choroidal vessels very visible at periphery, but not at central area; marked lateral nystagmus, varying in rapidity and range; considerable photophobia; refraction My. about 6 D. with considerable As. (exact amount could not be determined); has spectacles and sees better with them. III. 6, aged eight, better grown and nourished than III. 5; hair a shade more coloured, very pale flaxen and was so at birth, long and abundant, and evenly tinted from root to tip, lashes and brows fairer but not quite white; in other respects almost exactly like III. 5, except that pupils are decidedly more red; skin not irritable; refraction My. As. about 6 D. vertical, 3 D. horizontal and has corresponding spectacles. III. 3, aged 21, not seen, dark hair. III. 4 died of heart disease, aged 15 years, would be 18 now; had light hair and blue eyes, good sight and no nystagmus, did not wear glasses. III. 7, aged five months, very healthy and well nourished, hair lightish brown, irides blue, no nystagmus. Mother (II. 4), nearly black hair, dark brown irides, married at 19, now about 42, has had only the five pregnancies; all were born at full term and she and her husband have had no illnesses. Her three siblings, all dark, II. 1 and 2 single; II. 3, seen, black hair and dark brown eyes, has two children, of whom III. 1, aged two, seen and has dark hair and eyes. No information about I. 1 and 2, except that they were certainly not consanguineous. Father (II. 5), farm labourer, small man, about 5 ft. 5 in., hair now medium brown, formerly very light and curly, eyes quite blue; married at 23. He is one of five, all the other four have children (III. 8), but he knows nothing as to colour of hair and eyes in any of them nor in his parents or their siblings (I. 3 and 4 to 6); is sure his parents (I. 3 and 4) were not related. Neither he nor his wife have ever heard of albinos in any relations. Mother (II. 4) says the nystagmus in the albinos was seen "at birth," and that they "took notice" as early and as well as her other children. (E. Nettleship.)

Fig. 499. II. 2, an albino boy, aged 11, seen by Haldat at Nancy; myopic, photophobic, with nystagmus; pupils in daylight very pronounced rose; red colour of iris disappears in shade, and iris then appears light blue; hair white; skin, dull white with feeble rose colour on cheeks. Father, I. 1, robust and good constitution; mother, I. 2, less strong, but no malady except occasional haemorrhage. Both parents had "bleu cendré" eyes and chestnut hair. The mother was aged 43

at the birth of the albino and there were several other normal children¹. (Haldat, "Recherches sur les albinos d'Europe," *Journal de physique*, T. 70, pp. 144—56, Paris, 1810.)

Fig. 500. Two complete and two incomplete albinos in a sibship of five, offspring of European Americans. II. 1, aged 25, height about 6 ft., but not lusty; he saw best in the evening; appetite good, but frequently attacked by vomiting bile, otherwise health fair; very subject to haemorrhage from nose, eight or nine times a day, and not due to blowing it. Had had smallpox by inoculation favourably; later an intermittent fever for 14 weeks, which had injured him. Had worked with his twin brother (II. 2) at digging ore, then for three years in New York, where II. 2 had caught and died of yellow fever, but II. 1, although sharing same room, had escaped. When seen by Coxe was a beggar or tramp. Hair of head, eyebrows and lashes, also of body a transparent white, "not like gray hair of age"; skin very light colour; eyes deep in sockets and openings of lids small, pupils light rose, and irides light gray colour; tunica conjunctiva usual colour, but blood vessels towards canthus more conspicuous or numerous than ordinary, possibly arising from his frequent sore eyes when walking in the wind. Slight tremor of the head from birth, occasional cramp in fingers and legs and weakness in his arms. His twin brother same tremor, red pupils and general appearance; they had both seen better as children. Of their siblings, II. 3 had normal eyesight, sandy hair, and died young; II. 4 and 5 had red pupils, but were less photophobic than the twins; they had brown hair, and one died at four and the other at two years old. Thus all the siblings were dead except II. 1. The father, I. 1, was employed as waggoner in ironworks in Maryland; he was of brown complexion; no details as to mother; II. 1 promised to bring her for inspection, but never did. (Dr J. Redman Coxe, *Philadelphia Medical Magazine*, Vol. i. pp. 151—6, Philadelphia, 1805.)

Fig. 501. One case of partial albinism of eyes only in a sibship of 14. V. 16, an intelligent boy, aged 12 (1908), seen; hair light brown, lashes dark and brows like hair; skin blond; on face small faint freckles; iris blue with single small symmetrical yellow spot below, near pupil; nystagmus constant lateral, rate of movements 140 per minute; pupils black, red after atropine, were never known to be red; R. convergent concomitant strabismus; refraction R. H. 3.5 D. vertical meridian, 5 D. horizontal meridian, V. corrected $\frac{6}{24}$, L. H. 4 D. vertical meridian, 5.5 D. horizontal meridian, V. corrected $\frac{6}{18}$ partly; astigmatism is corneal (ophthalmometer showed 2 D. in each); fundus pale, not markedly so, choroidal vessels visible, fundus is obviously not so pale and choroidal vessels not so clearly seen as is the case in V. 10; colour vision normal (wools); fields, R. field of vision with a 10 mm. square piece of cardboard as test object recorded in following order: above, temporal side, below, nasal side; white, 50°, 82°, 68°, 49°; red, 35°, 65°, 38°, 28°; blue, 32°, 62°, 35° 27°; green, 28°, 52°, 28°, 22°; occasional fine lateral movements of head of short duration seen when reading; height, 55½ in.; weight, 4 st. 13 lbs.; has never had fits, but not very strong; seen by me (C. H. U.), aged seven months, and had nystagmus then. V. 13, aged 14 (1908), seen, hair light brown, perhaps fairer than V. 16, mother says it has been formerly lighter than his; skin blond; iris blue; refraction R. H. 1.5 D. horizontal, My. 1 D. vertical, V. with correction $\frac{6}{9}$; L. H. .75 D. horizontal, emm. vertical, V. corrected $\frac{6}{9}$ partly; fundus very pale, choroidal vessels sharply defined, small bundle of opaque nerve fibres, lower part right optic disc; no nystagmus; P. black. Father (IV. 1), hair brown, fair in boyhood, eyes blue; fundus not pale. Mother (IV. 10), hair light red-brown, brows and lashes still fairer; iris blue with yellow ring near pupil; fundus not pale though choroidal vessels are seen in some parts. III. 1, hair brown, blue eyes. III. 5, youngest in family; hair brown, fair when young. II. 1 in army. III. 12, hair red, only son, no nystagmus, reads, but bad vision, wore glasses, eyes blue. Maternal grandmother (III. 19), seen, hair red-brown, blue eyes, no nystagmus. II. 2 dead of cancer. II. 4, hair light brown, eyes blue. II. 7, hair black. II. 10, hair black, whiskers red, eyes blue. II. 13, hair fair, eyes blue. I. 1 not albino. I. 2 rather dark. I. 3 and 4 not albinos. I. 5, no information as to hair. V. 6 to 17, blue eyes with one (?two) exceptions, all fair-haired when young, called by friends "white mice." V. 6, hair fairer than V. 16, no nystagmus, his children (VI. 5 to 8), seen, hair red and light brown, eyes blue, one has internal strabismus, none with red pupils or nystagmus. One of IV. 2, hair brown, has large family (V. 1 and 2), all fair, most have blue eyes, children (VI. 1 and 2) of V. 1 all dark. VI. 3, no information. V. 3 not albino. VI. 4, no information. IV. 9 to 16, all red hair and blue eyes, their children (V. 18 to 23) generally had fair or red hair; V. 20, very fair, his child's (VI. 9) hair red-brown. III. 1 to 7, hair generally brown, also hair of descendants IV. 3 to 8; IV. 4 was fair, eyes blue, died young; V. 4 and 5 rather fair; III. 17 to 20, hair red or fair; IV. 18, large family, issue of one of III. 17, some dark; IV. 18, issue of other of III. 17, two at least, hair red; III. 20, several died in infancy; II. 3, 5 and 6, dark, also children III. 8 and 10; II. 9 and her children, III. 13 to 15, hair dark brown; II. 11, one was dark, had family (III. 16) of 16, no information except they married and had families, a male (IV. 17), hair brown, had two children (V. 24), hair red; II. 12, 14 and 15, hair brown; III. 22, hair brown. (C. H. Usher.)

¹ Haldat notes another case in which a father and son were partial albinos; white skin and hair, violet eyes and nystagmus in father, child hair "blond clair" and blue eyes—no further details.

PLATE XLV. Figs. 502—506 give pedigrees, not exactly albinotic, but referred to in the text of this monograph.

Fig. 502. II. 1 was an albino girl born of mulatto parents in Nova Scotia, but seen by Winterbottom in Sierra Leone, at the age of 9 or 10 years. She had all the features of a negro, with woolly hair of a dirty white colour, and skin equal in whiteness to that of a European, without anything disagreeable in its appearance or texture. Her eyes were between red and light hazel colour, but not much affected by light. (Dr Thomas Winterbottom, *An account of the Native Africans in the neighbourhood of Sierra Leone*, Vol. II., p. 168, London, 1803.)

Fig. 503. III. 1, Henry Moss, a negro, who appears to have suffered from leucoderma. He had a streak of white of perfectly European complexion about 1 in. broad and elsewhere 2 in. on his face. Back of neck, breast, arms and legs of same white, interspersed with small specks of African colour "not unlike the freckles which appear on the skin of a fair woman in summer." Whole area of black skin left in 1794 (first sensible change in 1792) not a square foot, and seen again after an interval of a month the black parts had sensibly diminished. The case might be passed as a very ordinary one, were it not for the ancestry, which provides some confirmation of the view that pigmentation changes are likely to occur in the offspring of mixed races. Moss' mother, II. 1, was the offspring of a negro and an Irish woman, and his father, II. 2, the offspring of an African negro and an American Indian woman. (Miers Fisher, "Account of a remarkable Change of Colour in a Negro," *Memoirs Phil. Soc. Manchester*, Vol. v., Part I., pp. 315—18, 1798.)

Fig. 504. "Further children are like their more remote ancestors from whom nothing has come, for the resemblances recur at an interval of many generations, as in the case of the woman in Elis who had intercourse with the Aethiops; her daughter was not an Aethiop, but the son of that daughter was." (Aristotle, *De generatione Animalium*, Lib. I., Cap. xviii., Prof. Platt's translation.)

Fig. 505. A black man, I. 1, married a white woman (I. 2) in York; their child was entirely black and resembled the father in every particular of colour and features, without in the least being like the mother; this surprised the people, who expected the child to be tawny. (Dr James Parsons, *Phil. Trans.*, Vol. LV., 1765, pp. 45—53.)

Fig. 506. A black man married a white woman and the child was as fair as any white child; the features were exactly like its mother's; the father said she was not his child, but was satisfied when shewn the infant's right buttock and thigh which were as black as its father. Dr Parsons went and examined the child in 1747 and found it true. (Dr James Parsons, *loc cit. supra*.)

Fig. 507. II. 2 a "Kaffir boy" drafted with a contingent of others from Barotseland to work on the diamond mines at Koffyfontein. He had fair complexion, yellowish white woolly hair on head and all other parts of body; pinkish sclerotics to eyeballs; about 25 years old; irides light bluish gray, no tinge of red and pupils black; skin of whiteness equal to that of a European, no larger pigment spots, but freckles on his face and neck. His parents and six brothers were normal. Kaffirs consider such "accidents" unlucky; the "boy" although well-formed and in every way equal to his fellows had to be discharged on that account. Only one case of albinism in 4000 "boys" examined. (Dr Thos. Strain, September, 1908.)

Fig. 508. II. 1, albinotic negress Amanua from Akra. The parents and four siblings said to be normal black. Skin pale white with usual black brown spots on shoulders, arms and breast about the size of cherries, none on legs or feet. Eyes clear blue and sensitive to strong light. Short curly hair of yellowish white colour. About 20 years old, healthy and otherwise normal. (Träger, "Vorstellung der 'weissen Negerin' Amanua..." *Zeitschrift für Ethnologie, Verhandlungen*, Bd. xxxiv., S. 492, 1902, with poor photograph of profile and back.)

Fig. 509. Rather different accounts have been published of these three sisters, who appear to have given gymnastic performances in the music halls of Berlin and Paris as the "Getigerten Grazien" or "Les trois grâces tigrées." II. 1, 2 and 3 were in 1896 aged 19, 18 and 17 and by name, Mary, Rose and Fanny Anderson; they are said to have been born of normal negro parents in South Dakota (but on another occasion were said to come from Sierra Leone). They had twelve normal brothers and sisters. Their skin is a dark chocolate brown, with many white spots and streaks; woolly black hair with haud-broad white woolly strip from forehead to top of head like a comb (compare our Plate H for a similar case). They are very athletic and of tall stature. The case appears like that on our Plate H, to be congenital, and is probably as that case, and the "white-lock" cases hereditary. (Maas, "Getigerten Grazien," *Zeitschrift für Ethnologie, Verhandlungen*, Bd. xxvii., S. 421, Bd. xxviii., S. 221, 1896. M. Baudouin, "Trois cas d'Albinisme partiel," *Bulletins et Mémoires de la Soc. d'Anthropologie de Paris*, 1905, p. 459.)

Fig. 510. I. 1 and I. 2, both full blacks and non-consanguineous, have two children, II. 1 an albino child and II. 2 typically black. (Dr I. Costa, Jamaica.)

Fig. 511. II. 1 and II. 3, two young negroes, cousins, both albinos, who were employed as servants in Lisbon in the early part of the 19th century ("a few years ago," 1827). They were natives of Angola, descended from black parents. One was considerably freckled, the other deeply marked with smallpox; they had the woolly hair, though sandy-coloured, flat noses, thick lips, long arms, high calves, etc. of the negro race, but their complexions such as occur in the northern countries of Europe. Lazy and useless as servants. ((Hamilton?), "White Negroes," *London Medical Repository and Review*, London, 1827, Vol. v., p. 266.)

Fig. 512. "Vidi hic etiam plane albissimum juvenem octodecim annorum, pilis crispis albissimis et superciliis albis, cute albissima, naso plane more Aethiopum, qui natus hic è patre et matre Nigritis." (G. Margrave, *Tractatus Topographicus... Brasiliae*, Caput III., p. 12, Amsterdam, 1658.)

Fig. 513. A pied or partially albinotic negro, I. 1, living at Praya, capital of the Archipelago of Cape Verde, married a normal negress, and had for issue three pied sons (II. 1—3) only. The sons were born with the white patches. II. 1, the eldest brother, aged 20 in 1901, was described by the two others, who were seen, to be spotted like them. II. 3, a child aged 10, had the body almost wholly black. He had, however, a white patch on the middle of forehead, reaching a little on to the head and the hair on this was equally white. Another triangular white spot was found on the right side of the chest, and a much larger one, having the appearance of an irregular quadrilateral, on the left side, stretching from the left nipple to the middle of the abdomen on the left of the navel. There was besides a small spot, of the shape of a crescent above the left knee, and another placed obliquely across the right leg, this last started from the outside of the right knee, running downwards in a slanting direction and ending on the inner side of the right calf. The white spots were sprinkled over with tiny black specks of variable diameter, and possessing all the characters of the normal skin of a negro. II. 2, the brother of the above, was 13 years old. This boy was much more spotted with white than II. 3. He had a white spot on his forehead at the limit of which the hair was white; the inner side of each eyebrow was also white. He had besides a large spot of rectangular shape and almost square, which began below the nipples, covered all the front and lower part of the thorax and continued over the abdomen, stopping a little below the navel. It continued sideways to right and left without encroaching on the dorsal region. Finally each lower limb was spotted from the middle of the thigh to the middle of the leg. On the right thigh the white patch mounted a little higher than on the left one. It is to be noted that all these patches were not uniformly white, but of a ruddy colour, and that they here and there showed black patches of greater or less extent, as in the preceding individual. The piece of the knee above the knee-cap showed a fairly large black spot. This case of a father and three sons all pied is a further illustration of the heredity of partial albinism. (Neveu Lemaire, "Sur deux cas d'Albinisme partiel observés chez des Nègres aux Îles du Cap Vert." *Bulletin de la Société zoologique de France*, Paris, 1901, pp. 179—192.)

Fig. 514. I. 1 and I. 3, two female albino negresses born in New York State of perfectly black negro parents. They were aged seven and four in 1860, and a normal black child was born between them; there are several other children, all black except II. 4, another female albino who died young. In the case of II. 1 and II. 3, the hair of the head, the eyebrows and down of the body is milk white, that of the head being slightly yellow, otherwise it has all the usual negro features. The skin is white and soft; the iris and pupil are pink; as the iris does not act as a diaphragm, the children partly close their eyelids and shade their eyes with their hands. They are myopic but healthy and intelligent. No further details. (S. Kneeland, M.D., *The Boston Medical and Surgical Journal*, Vol. LXII., pp. 253—9, Boston, 1860.)

Fig. 515. II. 1, a white negro seen at Bahel by Anne Raffenel. He was born of black parents and had black brothers and sisters, number not stated. He had the colour of a European exposed to the action of the tropical sun. Tint of hair and skin red, but the hair had kept its woolly aspect and the features of his race were present almost in an exaggerated form, there were spots of black and of red (? freckles) on his face which gave him a strange aspect. His eyes were greenish and the white of his eyes a deader colour than usual with blacks. According to the negro view of albinos, he was allowed to live without working, and he was sure of getting what he asked for. "God does not wish the albino to work like other men, and so has given him the colour of white men" is the view in Senegambia. (A. Raffenel, *Voyage dans l'Afrique occidentale*, Paris, 1846, p. 228.)

Fig. 516. II. 1, a white negro from Sierra Leone, only son of normal negro parents. He was aged 24, light yellow woolly hair, blue eyes and some nystagmus. He gave himself out for an "English gentleman," but exhibited himself at the *Panopticum* in Berlin. The other negroes in the show would have nothing to do with him and said he was a cannibal. (Maas, "Weisser Neger," *Zeitschrift für Ethnologie, Verhandlungen*, Bd. xxiv., S. 238, 1892.)

Fig. 517. The woman, I. 4, of pure negro race has had six children by three different pure negroes. By I. 3 she has had an albino boy, and a negro boy. By I. 5 she has had a second albino boy. Lastly

by I. 6 she has had two negro children (II. 8 and 9) and a miscarriage at four months (II. 10). She is not consanguineous with any of the fathers of her children. The negro I. 3 has had children from two other negro women; first from I. 1 a pure albino child, and then from I. 2 a complete albino girl, II. 2, and two normal offspring, II. 3 and 4, who are stated to be perfectly black. There is no consanguinity between I. 2, I. 3 and I. 4, and none recorded between I. 3 and I. 1. We have thus two persons, who have each made three matings, and in the five resulting sets of offspring there are albinos in all but one. II. 5 has horizontal nystagmus and photophobia; crinkling and wrinkling of skin, which is coarse and freckled. II. 7 has practically no nystagmus, but photophobia as usual. His mother, I. 4, has suffered for some time from malarial peripheral neuritis but is now well. Photographs of mother and son appear as (93) and (94) on Plate DD. II. 3 is a light coloured negro with no white blood in him. (Dr I. Costa, Jamaica.)

Fig. 518. II. 1 is a Myambaam male about 20 years of age, not married (see Plate DD. (95) and (96)). He has the usual negro albino characters. Yellow hair on head, eyebrows and pubes; there is well-marked eczema of the skin. His father and mother (I. 2 and I. 1) were both black, and his father has a normal black offspring by another black woman. (Dr G. A. Turner, Johannesburg.)

Fig. 519. III. 1, a complete albino, aged six, is the illegitimate child of a young woman, II. 1, healthy and almost black hair; the father is alleged to be a man in good position, but no particulars known. II. 1, seen, has now gray hair but dark eyes; no information as to I. 2. Child had been sent to a blind asylum because she stumbled over objects in house. The teacher there says that she is not mentally deficient; while a little peculiar in manner, she is intelligent. Her irides are free of pigment, pupils pink; nystagmus hindered an estimate of refraction, nor could the fundus be well seen, yet she is certainly not myopic and probably nearly emmetropic. Visual acuity is measured by fingers at about six feet, but owing to age and backwardness no precision possible. (Dr H. Wright Thomson, Glasgow.)

Fig. 520. III. 3, complete albino boy in a blind school, third in order of birth; III. 2 has St Vitus' dance, and of the two brothers and three sisters all are fair except one brother, eyes of all a dull gray blue; three are "troubled with deafness." The father, II. 2, has a very white skin, but no skin trouble, hair light brown and eyes brown, but wife has noticed a red reflex. He is a delicate man. II. 3, the mother, has St Vitus' dance and fits; she has spent at intervals many months in hospital; clergyman of parish says of II. 2 and 3, "never should have been married." I. 3 fair with brown eyes, I. 4 very light brown eyes. No hair or eye data for I. 1 and 2. There was no consanguinity between II. 2 and 3. There were said to be no other albinos in the family, but the great aunt of II. 3 had a son who died aged three, "very peculiar looking," who had white hair and "light" eyes, most probably an albino. Nottinghamshire. (K. Pearson.)

Fig. 521. I. 1 and 2 were two Malay parents of the usual colour of their race. II. 1 and II. 3, aged 16 and 6 years respectively, had skin of a light colour, thinly scattered over with small light brown patches (probably freckles as in other native albinos), but II. 5, the infant, had "no blemish on its integument." The albinos were plump, had flaxen hair and light blue eyes and the flat noses of Malays. They would otherwise have passed as the offspring of Europeans, with skin in some degree freckled. The natives looked upon them as a curiosity, but not as diseased. There is no information as to sight, and the author like others of his date was willing to class albinism as a variety of leprosy. (Geo. Bennett, F.R.C.S., *Wanderings in New South Wales, Batavia, etc.*, Vol. I., p. 437, London, 1834.)

Fig. 522. II. 3, Chinna Abboye, aged 35, resident in Madras, shepherd caste, Vaishnava sect mark on forehead, an albino, yellowish-white hair where long, as in the kudumi. Bristles on top of shaved head pure white, green-brown irides. I. 1 dark; I. 2, the mother, like II. 3, white hair and pink skin; the brother (II. 2) an albino, married, one child (III. 1), of the usual dark-skinned native type. II. 3 cannot see well in glare of sunlight, but better towards sunset, screws his eyelids into transverse slits. (E. Thurston, *Madras Government Museum Bulletin*, Vol. IV., p. 119, 1901.)

Fig. 523. II. 1, Vemba Achari, 20, artisan, resident in Madras, kudumi, yellowish white, white eyebrows and moustache. Bright pink lips and complexion. Iris light blue with pink radiating striae and pink peripheral zone, sees best in the evening and when sun is low on horizon; screws up eyelids to act as a diaphragm, cannot see a small doll across the room in a bright light. I. 1 and 2 and "brothers and sisters" (I. 2) number not stated, all of ordinary native type. Knows of no albinotic relatives. Persons like II. 2 called *cherapu* (red-coloured) or in derision *vellikaran* (European or white man). (E. Thurston, *loc. cit.*, p. 119.)

Fig. 524. II. 3, Moonoosawmy, aged 45, belongs to the weaver caste, well-to-do man resident in Madras, an albino. He had an albino sister and a normal brother (II. 1 and 2). He is the father of 10 children of whom five are albinos. They are on terms of equality with other members of their community, and an albino daughter is likely to marry the son of a prosperous man. (E. Thurston, *loc. cit.*, p. 119.)

Fig. 525. II. 1, Moonosawmy, aged 22, fisherman caste, an albino. His mother's brother, I. 3, has an albino daughter (II. 6), and he had four brothers of whom II. 2 and 3 were albinos. He cannot stand glare of sun and unable to do any outdoor work. He moves freely among members of his community and could easily secure a wife, if he was in a position to support a family. (E. Thurston, *loc. cit.*, p. 120.)

Fig. 526. "At Perdon Island off Cape San Blas I saw three children by the same father and mother, two of whom were albinos." The natives of the Island were Indians. (Dr Cullen, *Isthmus of Darien Ship Canal*, London, 1853, p. 74.)

Fig. 527. Three albinos in a sibship of nine. I. 1, albino boy, lived only four days; I. 4, aged 20, and I. 7, aged 14, in a blind institution. The elder albino is employed as a basket maker in the workshop, and the younger is still in the school. Both have great natural aptitude for basket making, and the younger has excellent mental ability and is very musical. Photophobia and usual characters of complete albinism; no change in sight, improvement or deterioration, during their seven years at the institution. Three generations back on the mother's side, there were two male cases of albinism (I. 2 and 3). Another informant says that the mother has an albinotic cousin. The parents spring from Luton. Fuller information has not been forthcoming. (Karl Pearson.)

Fig. 528. Albinism in a Tamil family for six generations. I. 1, female albino, had two sons and one daughter. The second son, II. 2, of the same skin colour as his mother, and eyes similarly affected; II. 1 and 4 were normal; II. 2 had nine normal children, six sons and three daughters. The eldest son, III. 2 had three sons, IV. 1—3, and two daughters, IV. 4 and 5, all normal. The second son, III. 3, had a normal daughter, whose child, a girl, V. 3, was an albino. The eldest daughter and fifth child of II. 2, namely III. 7, had an albino son, V. 8. The children of the other sons and daughters of II. 2 were all normal, but their number is not stated. Returning to the eldest son, III. 2, his eldest son had two normal children, V. 1 and 2, of whom the daughter, V. 2, has a child, VI. 2, which is an albino. (Rev. J. E. Tracy, published by E. Thurston, *Madras Government Museum Bulletin*, Vol. iv., p. 120, 1901.)

Fig. 529. The hereditary peculiarity is the presence of a patch or patches of skin which with the hair growing upon it is entirely devoid of pigment. In the great majority this patch is single and occupies the middle of the front of the scalp where it takes the form of a conspicuous tuft or lock of perfectly white hair; in some the whiteness extends well on to the forehead and in one (V. 19 and Plate H (22)) stops not far short of the root of the nose and is accompanied by a very small, separate patch in each eyebrow. Posteriorly the whiteness never extends so far back as the coronal suture. In a few (IV. 13, IV. 15, V. 18) there is a single white patch on a distant part of the body in addition to the scalp forelock, and in two a patch on the body but none on the head (IV. 19, VI. 3). The white tissues are more delicate than the rest of the skin and hair. The hair-colour of the family as a whole varies from light brown to nearly black. There is a tendency to early "senile" whitening of hair, but the hairs of the white lock can always be distinguished by their greater fineness. The eyes are quite normal and there has been no case of parti-coloured irides nor of whitening of eyelashes; the colour of the irides is not correlated with the presence of the white forelock. No other physical anomalies are known in the family, the members of which are long-lived, robust, intelligent and educated. The earliest known member was from Wiltshire; now they are scattered in several southern counties and in London. Very careful enquiry shows that not a single consanguineous marriage has taken place and that the two wives of IV. 17 were not related to each other. Of the six known generations four are living, and of these a considerable number both affected and normal have been seen. In size the breadth of the frontal white lock and skin patch has varied from about $2\frac{1}{2}$ inches (say 60 to 65 mm.) to a narrow streak exactly in the middle line, and there are considerable variations both in the shape and size of the patches on other parts of the body. Descent is always continuous from generation to generation and takes place from either sex to either sex, but the number of females affected is nearly double the number of males (15 to 8); of the 15 affected females four, and of the eight affected males four have had children; of the remaining 11 affected females six are too young for marriage and the same is true for three of the four affected childless males; this leaves five affected females and one affected male who might have had children but did not; of these two females married and had no issue, and three did not marry; the male was drowned at 23, unmarried; it is possible the white forelock operated in some degree against marriage in the girls of generation III. *Details*:—I. 1, died aged 83 in 1830; her granddaughter, III. 7, now living, knew her well and remembers that she had the white forelock. She appears to have had only two children. Nothing known of her ancestors. II. 1, known to have been "marked" with the white forelock and photograph seen; II. 2 was not "marked." III. 7, living and now aged 83 and vigorous, white forelock distinct in spite of her gray hair; the whiteness does not extend to forehead; said to have no patches on limbs or body. IV. 13, now 56, a very broad white forelock and the whiteness extends a short distance on to forehead, also a large patch of white skin on inner aspect of L. leg over the tibia; it does not extend round to back of leg. In a photograph taken when he was four, another when 20, and a third when 36, the white forelock is seen to be of same relative size as now. IV. 14, drowned at 23 years old; photograph shows large white forelock. IV. 15, aged 50, married but no children; has

a medium sized white forelock and states that she has a patch of white skin as large as the palm of her hand surrounding her navel. IV. 17, aged 48, small white forelock, no patches on body; has been married twice, first when 22 to a woman, IV. 16, aged 21, who bore him four children (V. 11 to 14), second when 30 to IV. 18, aged 27, by whom he has had the five children (V. 15 to 19). Of his nine children six are living and five of these are "marked" (see below); V. 14 was still-born and nothing is known of hair-colour; V. 11, who died of scarlet fever, had the usual white forelock, and V. 17 who died of small-pox at six was also "marked"; no information as to body patches in these two. IV. 19, aged 46, was told by her mother that as a child she had a white patch on each knee, but the woman herself denies that she now has these white marks; her children are free. IV. 20, aged 44, has a very narrow, exactly median, white forelock which is also well seen in a photograph taken when he was about 13; no body patches; of his two children the daughter (V. 22) has a similar very narrow white tuft but no patches on the body, the son (V. 23) said to be quite free. V. 10, no white forelock, but a round white tuft on L. side of occiput and a round white patch of skin over sacrum (seen); of his four children, VI. 3, a little boy of four, has a narrow longitudinal white stripe of skin exactly over the middle line in the lumbar furrow. V. 12, grown up but unmarried, has a small but well-marked white forelock and is said to have no body marks. V. 13 was said to have no flare, but on examination six white hairs were found exactly central in his forelock (two of these hairs now in my care, K. P.). No white hairs elsewhere and rest of hair dark red. Moustache, axillae and pubes are dark red and skin white; the lanugo on each calf over the middle third of the inner part of the soleus muscle is whiter than elsewhere, but this is of doubtful value as evidence. V. 15 aged about 15, a very broad white forelock like IV. 13, the whiteness extending a little on to forehead, and very long luxuriant hair, said to have no patches on body. V. 16, aged 13, a moderate sized white forelock and small "flare" of white skin extending on to forehead. V. 18 has a small white "flare" at centre of forehead but no white forelock, and a long narrow triangular white patch placed obliquely from above down and in on L. side of abdomen. V. 19, aged about 11, is portrayed in Plate H. (22) from a photograph taken specially for this memoir; the flare on her forehead is larger than in any of the others and she also has a very small tuft of white hairs in the middle of each eyebrow, only one of which, however, has come out in the photograph; she has no marks on the body. It is to be noted that some other members of this genealogy may possibly have white patches of skin on body or limbs; but the willingness with which information has been given makes it unlikely that there has been intentional concealment of any conspicuous markings. (Case communicated by Mr Bishop-Harman to the Ophthalmological Society, October 15, 1908, and published in the *Transactions*, Vol. xxxix., Fasciculus 1.)

PLATE XLVI. Fig. 530. III. 1, only child of first cousins, died August 1908, was a complete albino, nystagmus, but no other eye defect, and no other ailment. His father, II. 1, died very old, blue eyes (hair?); his mother, II. 2, died at 100 years, blue eyes and fair hair. The father was also an only child, his parents, I. 1 and I. 2, being normal and unrelated. The maternal grandparents, I. 3 and I. 4, were unrelated and normal. The mother's brothers, II. 3 and II. 5, are now dead. II. 3 had many children, none albinotic; II. 5, born 1807, had five children, three died in infancy, the two daughters, III. 5 and 7, both married; III. 5 had seven normal children, IV. 10; the second, III. 7, married and had six normal children; one son, IV. 12, married an unrelated wife and has three children, V. 5, a male and V. 6, a female, are complete albinos, the third, V. 7, is normal. Returning to the albino, III. 1, their first cousin twice removed, he had nine children and four of these are married and have seven, five, two and one children respectively; none of the children or grandchildren of the albino are albinotic. Origin near Hamar, Norway. (Dr A. G. Vange, through Dr V. Magnus, Christiania.)

Fig. 531. A complete albino in a sibship of one. III. 1, man aged 70, looks much younger, seen (1908); an intelligent farm labourer able to do as much work as anyone else; hair abundant and white, lashes and brows white; skin blond, not freckled; iris gray blue, red tinge through most of it; pupils red; nystagmus constant lateral, rate 136 per minute; strabismus left divergent; marked photophobia; meibomian glands conspicuous through conjunctiva; refraction R. H. 6 D., V. with correction $\frac{6}{36}$ partly; L. H. 6 D., V. with correction $\frac{6}{36}$ partly; in each, ophthalmometer showed not more than 1 D. of As.; colour V., tested with wools and spectroscope, is normal, fundus albinotic; hearing R. watch at 1 in.; L. watch on contact; has been rather deaf 10 years; smell, could not name peppermint, cloves, iodoform or assafetida, but said he smelt them though last two were not unpleasant; height 5 ft. 8 in.; weight 10 stone, 11 $\frac{3}{4}$ lbs.; is widower. Mother (II. 4) an only child; hair yellow; eyes blue; had good vision and no nystagmus; the albino (III. 1) was her illegitimate child before marriage with II. 6. Father (II. 3) illegitimate, hair brown. I. 2, father of II. 3, no information as to hair and eyes. I. 3, father of II. 4, no information. I. 5, mother of II. 4, dark, by her second marriage, five children (II. 5), none albinos, their children, III. 4, are abroad, III. 5, all dead, none known to have been albinos. I. 6, no information as to pigmentation. II. 1 and 2, not fair. III. 2, wife of albino (III. 1), was dark, the two were called "white John and black Mary," "none of her relations fair." IV. 1, hair brown; iris blue; fundus not pale; her children: V. 1, dark hair, blue iris; V. 2, died 1 $\frac{1}{2}$, hair (seen) light brown, eyes blue; V. 3 have red-brown hair and blue eyes. IV. 2, died $\frac{1}{2}$, and IV. 3, died 1 $\frac{1}{2}$, neither albinos. IV. 4, hair auburn, eyes blue, his children (V. 5), four females, have brown hair, one auburn, and blue iris, one hazel coloured.

IV. 5, died 17, not albino. IV. 6, hair light brown, very fair when young, iris blue gray, no nystagmus; his children (V. 6 and 7) have fair hair (reddish, yellow and brown), except eldest with very dark brown, iris blue and gray-brown, except eldest with dark brown iris. IV. 7, hair light yellowish brown, iris blue; his children: V. 8, hair light brown, brownish gray iris; V. 9, hair yellowish white, iris blue, dull red reflex seen with difficulty, refraction H., fundus not albinotic but is light, eyes have been seen by mother to look red "like a cat's." V. 10, hair brown, iris blue [IV. 6 and IV. 7 and children V. 6 and 10 were examined by Dr W. Clark Souter]. IV. 8 and 9, single, not fair. II. 6 and 7, all dark, their parents (I. 7 and 8) dark; siblings from marriage of II. 4 and II. 6 (III. 6—12) were dark, they had large families (IV. 10—18), nearly all dark; in IV. 15, some red. V. 11—12, 3 fairish, 1 dark. (C. H. Usher, September, 1908.)

Fig. 532. Two complete albinos in one sibship. V. 5, woman, aged 38 (1908), seen; subject to "indigestion" is otherwise robust, never had serious illness; hair quite white except the free ends which are slightly yellow, brows and lashes quite white, skin blond, no freckles, it gets red from sun, iris blue-gray, translucent and looks red when light reflected from fundus, pupil red, constant lateral nystagmus, photophobia, internal concomitant strabismus, meibomian glands readily seen through conjunctiva, refraction R. My., L. My. vertical, H. horizontal; V. "cannot read small print," "no difficulty with colours," fundus albinotic, catamenia regular, height 5 ft. 3 in., is unmarried. V. 6, man, aged 32 (1908), seen, height 5 ft. 7 in., weight 9 stone 11 lbs. (one year ago), memory good, temper even, is of average robustness, had "rheumatic fever" and "brain fever" in childhood, hair, brows and lashes white, skin intensely blond, not freckled, it gets red from sun, iris blue-gray, translucent, and looks red when light reflected from fundus, constant lateral nystagmus, rate 180 per minute, no strabismus when eyes fix distant object, on convergence one eye diverges, photophobia marked, conjunctiva too red, is exposed to particles of dust and paint, meibomian glands not conspicuous, refraction R. and L. H.; is unable to read small print, eyes ache or tire when reading, colour V. normal, fundus very albinotic, is married, his wife has dark hair, is not a cousin. His children (VI. 1 and 2) have fair brownish hair, iris blue. Father (IV. 5) living, aged 63, hair light yellow now mostly gray, iris blue, no nystagmus, was called "white headed Bob" when in Navy. Mother (IV. 12) living, aged 57, an only child, hair formerly creamy yellow, gray now, iris blue, refraction H., married at 19. III. 1, father of IV. 5, hair dark brown, eyes blue. III. 4, mother of IV. 5, hair brown, good vision. III. 11, father of IV. 12, living, aged 83, hair light brown, eyes blue, fair complexion, very fair when young, good vision, no nystagmus. III. 17, mother of IV. 12, living, aged 82, hair very dark brown, eyes gray-blue. II. 1, married twice, no information of children by second wife, no information about his hair, no albinos known besides V. 5 and 6. II. 2, no information except married twice, not known if issue by first marriage. II. 3, hair dark brown. II. 4, hair dark. II. 6, rosy cheeked, hair dark brown, died, 85. II. 7, not an albino. II. 8, hair very dark, died, 82. II. 10, hair dark, died after 80. I. 1, lived in same town as V. 5 and 6. II. 5 was in army. II. 9, no information except had a daughter (III. 22) with brown hair. III. 2, hair and eyes dark brown, single, died, 85. III. 5, hair dark, had several children with dark hair (IV. 7). III. 7, 8, 9, 10 and 12 to 16, also 18 to 21 had generally brown and dark brown hair. IV. 1 and 2, all dark, the female married, had issue (V. 1 and 2) both dark with blue eyes. IV. 3, dark, his children (V. 3) dark? IV. 4, fair hair, blue eyes, no nystagmus, has six fair children (V. 4), none like V. 5 or 6. IV. 6 died 21 months, golden hair, no nystagmus was noticed. III. 6 and his family (IV. 8) dark. V. 7, not albino. IV. 9 and offspring (V. 9 and 10) all dark. IV. 9, 10, 11, 13, 14 and 15, have brown hair, none are specially fair, the offspring V. 11 and 12 are similar. III. 16, married three times. IV. 16, 17 and 18, III. 14 and VI. 3 are dark or medium, none fair. IV. 19, twins, three times, hair dark or medium brown, one had flaxen hair, was not like V. 5 and 6. IV. 20, hair rather light brown, most died from phthisis, two married, V. 15, hair medium and light brown, V. 16, hair light brown, eyes blue. IV. 21 and 22 and their children (V. 17), hair light brown. IV. 23 and their children (V. 18—21) generally dark. VI. 4, hair very light brown, eyes blue, no nystagmus, died at three. (C. H. Usher, October, 1908.)

Fig. 533. Albino girl, III. 1, aged eight, completely albinotic, nystagmus, one eye myopic, the other cataractous lens (Dr Wright Thomson), mentally defective, and in a class for such children. Only child of II. 3 by a first husband, II. 1, who had black hair and very dark ("next to black") eyes. II. 3 has almost black hair and gray eyes. She has just been married a second time, neither husband being related. No information about relatives of II. 1 who was a stranger to II. 3 till marriage and died in first year of marriage. The mother's siblings, II. 2, 4—12, said to be all healthy and with normal sight, all but one, who died in infancy, being still alive; all are dark haired with dark eyes. I. 2 has a number of unmarried sisters alive, all healthy and non-albinotic. No other case of albinism known in stock. [The husband's family came from near Carlisle, the wife's from Fifeshire, but inquiries near Carlisle have failed to provide any clue.] (Karl Pearson, information from II. 3, to whom reference was given by Miss J. Walker.)

Fig. 534. Three albinos in a sibship of four. III. 4, aged 6 (1908), albino with no pigment in hair or iris, nystagmus, refraction H. As. 3 D, small and ill-developed, but not more so than his class-mates, lives in a very poor district, is considered a smart boy by his school teacher. III. 6, aged three, said by

mother to be albino like III. 4. III. 7, aged $1\frac{6}{12}$, albino with no pigment in hair or iris; III. 5, aged 5, brunette; she also has H. As. 3 D. She has pigmented fundus, no nystagmus, irides grayish blue. The mother, II. 7, is the fourth born of eight and a brunette. One of her sisters, II. 8, has married the father's brother, II. 2, and has five normal children, all fair but not albinotic. The father, II. 4, aged 26, now reddish fair hair, his father, I. 2, was "very fair," but his mother, I. 1, "normal." Of his siblings, II. 6, are two who died in childhood, place in family unknown. II. 1 is married but without family; II. 2, we have already referred to; II. 3 has two out of six fair, but not white children; II. 5 has one fair but not white child. The whole family, II. 1—6, were very fair as children, and could not face the light, they are now reddish fair except II. 3 who is brown, another illustration of the link between the rufous and the albinotic. II. 7, who gives the information, says there has been no mental defect or abnormality in the family. Her mother and father were healthy and none of her siblings are remarkably fair. No consanguinity of parents anywhere. (Dr H. Wright Thomson, Glasgow, October, 1908.)

Fig. 535. One complete and several incomplete and partial albinos in two generations; distribution of the partial albinism not the same in every case. Man, IV. 18, aged 24 (1908), seen, unmarried, hair and lashes yellow, brows lighter, skin blond, some freckles on face, iris blue, pupils no red reflex, nystagmus rotatory, 132 per minute, slight left internal concomitant strabismus, no photophobia, movements of eyes full, refraction R. H. 2 D. in both vertical and horizontal meridians, V. corrected $\frac{6}{36}$, L. H. 1.5 D. in vertical meridian, 4 D. in horizontal meridian, V. corrected $\frac{6}{36}$ partly; colour vision normal (wools and spectroscope), fundus albinotic, only at macula choroidal vessels not seen, no involuntary head movements; hearing and smell quite satisfactory, height 5 ft. $8\frac{1}{2}$ in., weight $11\frac{1}{2}$ stone, good ability and memory, robust previous to operation for "obstruction of bowels." Girl, IV. 22, seen, aged 10, hair very fair, skin blond, blue iris, no nystagmus, refraction estimated R. low H. V. $\frac{6}{12}$ partly, L. emm., V. $\frac{6}{12}$ partly, reads small print at 6 in., not improved by lenses, fundus normal not pale, bright well-nourished child. Male, V. 10, seen, aged 16 months, hair, lashes and brows white; skin blond no freckles, iris pale blue, pupils red, constant lateral nystagmus, 92 per minute, no strabismus, meibomian glands clearly seen through conjunctiva, photophobia formerly more marked, not so robust as other siblings (V. 8 and 9). Male, IV. 13 (seen by Dr Thomas MacHardy), aged 36, recently married, hair fair, iris blue, nystagmus, skin blond. Female, IV. 20, aged 20 (seen by Dr MacHardy), hair fair, iris blue, nystagmus, strabismus. Mother of IV. 11—22 (III. 20), hair brown, iris blue with yellowish brown spots, L. divergent concomitant strabismus. Father (III. 7), hair auburn, very fair formerly, iris blue with brown spots; II. 9, hair brown, iris blue, maternal grandmother (II. 14), hair very dark, eyes brown; I. 2, dark; I. 3, fair, eyes blue; I. 4, no information as to albinism; I. 5, dark; II. 2, dark, eyes brown; II. 5, hair brown, eyes blue; I. 1, hair white when seen, not an albino; mother of V. 8—10 (IV. 16), aged 29, hair auburn, eyes blue; husband (IV. 29), hair fair, eyes blue, his brother, IV. 30, hair fair, eyes blue; his sister, IV. 31, hair red, eyes blue; his parents, III. 21 and 22, fair, eyes blue; a grandfather fair, a grandmother dark (II. 16 and 17); V. 8 and 9, light brown hair, eyes blue; IV. 11, aged 40, hair brown, eyes blue, had 10 children (V. 6), eight died first few days, one living, hair fair, eyes blue; with two exceptions, IV. 11 and 15, all from IV. 11 to IV. 22 had fair hair, in all these it was also fair or very fair in infancy, blue eyes; IV. 12, died 1; IV. 14, hair reddish, had child (V. 7), died in infancy, hair fair, eyes blue; III. 5, dark, offspring, IV. 2 and 3 and V. 1, some dark others fair; III. 6, fair, so are IV. 4 and 5, some yellowish hair, and V. 2; III. 7—11, dark, female, III. 9, fair, died young; IV. 6—7 are illegitimate offspring of III. 9, two dark; V. 3 and VI. 1, all fair; IV. 8, many not fair; V. 4 and 5, no details; III. 17—20, some dark others fair, one (III. 17) with fair hair and blue eyes, had 10 descendants with same colour of hair and eyes and four that were dark (IV. 23—24, V. 11—12); IV. 25—28 and V. 13—15, some fair others dark; II. 1, hair red, one had issue (III. 1 and 2), one fair; IV. 1, no information; II. 3, yellow hair, her children (III. 3) fair; II. 4 and III. 4, dark; II. 6 and 7, hair brown; III. 13, large family, red hair; IV. 8, dark, one yellow hair, some no information; II. 8, yellow hair; II. 10 and 11, dark and fair, one reddish; III. 15 and IV. 9, most dark; III. 16, light brown; IV. 10, several families generally fair; II. 13, several died young; II. 15, dark; no consanguinity. (C. H. Usher, August 24, 1908.)

Fig. 536. Two complete albinos in a sibship of four. I. 4, man, not seen, albino; his wife (I. 5) dead; his two children (II. 3) not albinos. I. 3, woman, not seen, albino, married, no information as regards offspring. I. 1, had still-born child (II. 1), said not to have been albino. I. 2, has family (II. 2) of seven males, none albinos. (C. H. Usher, July 26, 1908.)

Fig. 537. II. 3, complete albino, except as to iris; she is $14\frac{6}{12}$, well-formed, intelligent, has menstruated since she was 13, hair called "white" is very light and plentiful, said to be turning darker, brows and lashes quite white, skin fair, no freckles; irides pale gray-blue with some "grayish-black patches here and there," "the irides are not at all translucent," and pupils not stated to be red, L. pupil eccentric owing to a slight adhesion of iris to cornea, probably the result of a small perforating wound in infancy, well-marked nystagmus, refraction H. As. 3 D. horizontal, V. of R. corrected $\frac{6}{80}$ barely, and only words of 12 Jaeger at 4 in., L. V. not so good, fundus very albinotic. Is in a school for the blind, reads

the Braille type and uses her sight very little, she can however go about alone in places she knows and can even do coarse sewing, her sight is not getting worse and has never been better, has no other congenital defects. Of her siblings, II. 4, born 16 months after II. 3, had fair ("not white") hair, and blue eyes which "twitched continually," was delicate from birth and died at two years of broncho-pneumonia after measles; II. 5, born three years after II. 3, fair hair and blue eyes but nothing known of sight or nystagmus, died at two years of scarlet fever, the other six are living; II. 1, aged 17, dark hair, brown eyes, wears glasses since seven; II. 2, aged 15½, hair was fair, now medium, irides blue with some brown near pupil, wears glasses since seven; II. 6, aged 10, hair fair, eyes blue, "sight bad" and has had glasses for a year, said to have weak heart; II. 7 aged 8½ like 6 in colour of hair and eyes and in needing glasses, but is the healthiest of the sibship; II. 8, aged five months, fair hair, eyes blue but thought to be turning brown. Mother (I. 1), dark hair, brown eyes, has worn glasses since childhood, has had no miscarriages or still-births, no information as to her siblings, if any; she and her husband not consanguineous in any degree. Father (I. 2), now 41, hair was "white" in early life, and is still fair, eyes blue, has worn glasses for reading since youth and said now to be phthisical; he has at least three sisters of whom the eldest (I. 3) "had hair like" II. 3 when born, but is now dark and has good sight; the other two (I. 4 and 5) are both "close sighted" and fair, one of them, I. 4, having very fair hair, and blue eyes and wears glasses, she (I. 4) has a number of children and one of them, a boy (II. 9), is said to be almost like the albino (II. 3). The albinism here seems to come from the father's side; it has affected the vision of II. 3 with unusual severity although the iris is only incompletely albinotic. (Mr Charles H. B. Shears, Liverpool, and Dr H. Osborne, Salford.)

Fig. 538. Two albinos in family of six. III. 1, aged 24, is in a blind workshop, can find his way about, but is said "for all practical purposes" to be blind, the photophobia being so intense that he is at times quite blind; he suffered from fits which lasted till five years old, and was so delicate that he hardly survived; mental slowness and nervous hesitancy in speech, although intelligence is good. Hair, lashes and brows snow white, irides devoid of pigment, fundi very pale; V. only shadows at 2 metres. Refraction H. about 1·5 D. with slight astigmatism, sight not improved by glasses (Dr Herbert H. Folker). III. 3 is a sturdier type, but still an albino; III. 2, 4 and 5 have dark brown hair and blue eyes; III. 6 has brown hair and brown eyes. The mother, II. 2, dark, knows of no cases of albinism on her own or her husband's side (II. 1, medium coloured hair) and no cases of mental defect. There was tuberculosis on her side, her mother, I. 2, and some other relations having died of it. II. 2 is said to have been frightened by a cat in third or fourth month of pregnancy, and to have imagined that III. 1 would be born with cat's eyes, the first question she asked after birth being to this effect. The mother accounts for second albino by presence of first. *No consanguinity*. (Karl Pearson, through Mr A. T. Story, Stoke-on-Trent.)

Fig. 539. One albino, II. 4, aged 14, in a sibship of ten, being fourth in order of birth; the boy is the smallest of the whole family and very small for his years. His hair is said to have darkened and his eyes to be more normal than formerly. He is, however, in a blind school owing to his defective sight. Hair, brows and lashes now light golden, but all perfectly white when he, aged 10, entered school. Irises now pale blue, fundi very pale, but no morbid appearances, pupils originally pinkish; pigment increasing. Refraction H. Astig. 1 D. and 2·5 D in chief meridians, axes oblique, V. corrected $\frac{6}{34}$ or part of $\frac{6}{24}$; nystagmus (Dr H. H. Folker). The siblings have brown hair and gray eyes. There is no tuberculosis, mental defect, or other albinism on either side of the family. The mother accounts for the albino by saying that she was alarmed at night by a cat, the staring eyes of which caused her great fright. The "cat" explanation appears thus to be current in the district. *No consanguinity*. (Karl Pearson, through Mr A. T. Story, Stoke-on-Trent.)

PLATE XLVII. Fig. 540. Three complete albinos in a sibship of three and one in a previous generation. III. 18, woman, seen, aged 18 (1908), robust, shy, good tempered fish-worker, memory retentive, catamenia regular; hair white, yellow at free ends, lashes and brows white, white hairs on upper lip conspicuous; skin blond, no freckles; constant lateral nystagmus, movements 104 per minute; iris blue; pupils black, equal, and active to light; no strabismus; photophobia not marked; refraction R. My. 4 D., V. corrected $\frac{6}{24}$; L. My. 7 D., V. corrected $\frac{6}{24}$; colour vision normal, fundus albinotic, but choroidal vessels not visible in yellow-spot area; occasional involuntary head-movements; height 5 ft. 4½ in.; weight 10 st. 6 lbs. III. 19, male, aged 16 (1908), reported an albino as bad in every way as III. 18, hair is even whiter; III. 20, female, aged 14 (1908), reported an albino like III. 18 and 19, hair red-yellow, eyes blue, skin blond, shortsighted. I. 2, hair very fair, reported an albino, no family, is sister of paternal grandmother (I. 3). Father (II. 3), aged about 55, hair brown, eyes blue, strong and well. Mother (II. 13), aged about 55, hair dark brown, fair when young, eyes blue, not strong "stomach," husband not a cousin. II. 1, hair black, eyes dark, children III. 1 to 6 hair fair, eyes blue except III. 6 hair auburn, eyes brown; II. 2 to 9, hair brown, blue eyes; III. 7, 8, 9 and 10, fair hair, blue eyes; III. 11 to 17, all dark; III. 21 to 32, hair brown or fair, blue eyes; III. 33 to 36, two with dark hair, two fair, eyes blue; I. 4, hair black; I. 5, hair black, same name as I. 1, came from neighbouring island, possibly related, information deficient. I. 1 and wife I. 3 from same small island, any consanguinity uncertain. (C. H. Usher, July, 1908.)

Fig. 541. A complete albino in a sibship of five. Male, II. 4, Okatana, aged about 28, from Gawa, a small island near Woodlark island (Papua), single, a sound strong "boy," always had good health; mentally seems in no way inferior to other natives; skin white with pinkish hue, without freckles (only clothing is over genitals), has ringworm; hair light yellowish brown; pupils dark reddish gray colour; iris light gray or bluish gray; teeth well developed and symmetrical; height 5 ft. $1\frac{1}{2}$ in.; circumference of chest $32\frac{1}{2}$ in.; antero-posterior diameter $7\frac{5}{8}$ in.; lateral diameter $10\frac{6}{8}$ in.; circumference around hip $32\frac{1}{2}$ in.; head measurements: fronto-mental $7\frac{9}{16}$ in.; occipito-frontal $9\frac{3}{16}$ in.; cervico-bregmatic $8\frac{15}{16}$ in. and suboccipito-bregmatic $7\frac{4}{8}$ in.; bi-parietal $5\frac{10}{16}$ in.; bi-temporal $4\frac{9}{8}$ in.; to malar prominences $5\frac{2}{16}$ in.; facial line from superior border of auditory meatus to fronto-nasal suture $5\frac{7}{8}$ in.; and to acantion $5\frac{1}{8}$ in. See Plate GG, 101. Mother, I. 2, and father, I. 1, normal natives. II. 1, 2, 3 and 5 are normal natives, all married. No account of any albino previous to II. 4, who is said to be the first albino born on Gawa island. (Mr John Taaffe, through C. H. Usher, August, 1908.)

Fig. 542. One albino in six. III. aged 10 months when seen in December, 1896, with pink pupils, nystagmus (lateral) and very pale tow-coloured hair; is the youngest of six, five living, one died at nine years of scarlet fever; all the four living siblings have dark hair and hazel eyes and no nystagmus; the eldest (III. 1) is "short-sighted" and wears glasses ordered at the Moorfields Hospital. Mother (II. 3) is third of 10, of whom two died young; all are dark. Her mother (I. 1), black hair and very dark brown eyes; her father (I. 2) has very fair hair and blue eyes, and all his three living siblings are fair with blue eyes, I. 5 having hair that was quite as white as III. 6; none except III. 6 have moving eyes or bad sight. Father (II. 11), short sight, blue steady eyes; his six brothers all dark hair and brown eyes; no albinism in his parents (I. 7 and 8). (Mr Marcus Gunn, Moorfields Hospital, 1896.)

Fig. 543. III. 2, aged 13, has a lock of nearly white hair on the head; in the R. eye there is a patch at the fundus diagnosed as a coloboma at the yellow spot. III. 1, aged 15, is stated both by the family doctor and the mother (II. 3) to be a typical albino. The mother, II. 3, is not fair but one of her sisters was "white" (II. 2). There is no known or no acknowledged consanguinity between II. 3 and II. 4, but they are so much alike that they have been taken for brother and sister. The mother's father (I. 2) was from the south of Ireland, her mother (I. 1) was a Spanish Jewess. (N.B. The above was got with some difficulty and recorder is not able to carry enquiry further. Mr Percy Flemming, November, 1908.)

Fig. 544. III. 2, an albino son, now dead, named Nenkondo, of Nenlaza, II. 3, the chieftainess of Majena, two days from San Salvador in Portuguese Congo. III. 3, a normal brother of Nenkondo, is shewn on the photograph Plate EE, 97 in company with him. There was an albino sister, III. 4, who died young. III. 1 by later advice represents a *single living black girl*. The family is a talented one, the mother a normal black native (photograph sent) is a capable chieftainess and the boys are good shots. II. 1, the first husband, should have been entered as a *partial albino*; he had a white scrotum, both hands were patched with white, e.g. back of some fingers, etc. His face was pale, such paleness, however, being by no means rare among these natives. (Such partial albinos have the distinctive name of Lukusu.) I. 1 and 2 were quite black. By a second normal husband, II. 4, who by three other wives had seven black children, Nenlaza has a normally coloured son, III. 5, with a white lock arising from a white patch of skin about the size of a franc piece; this boy has just married a mulatto girl, III. 6, the offspring of a native and a Portuguese; the result must be awaited with some curiosity¹. (Dr Mercier Gamble, San Salvador.)

Fig. 545. Three albinos in two generations. IV. 1, aged seven (about 1906), albinotic, no other description; has a fair younger brother (IV. 2). His mother (III. 2) and one of her brothers (III. 1) both albinos; they had seven siblings (III. 3, 4, 5), of whom four were or are fair; both their maternal grandparents (II. 1 and 2) and one great-grandparent (I. 1) fair. Father (III. 6), an only child, red hair; both his parents dark. (Dr John Rowan.)

Fig. 546. Three albinos in eleven. II. 9, now aged about 60, unmarried, living in an almshouse, but formerly in service, complete albino, with red pupils, but reported to have no nystagmus; no particulars of vision; considerable photophobia. II. 7, a complete albino, who died of heart disease at 62. II. 11, an albino who had white hair and pink eyes, dead. All the other siblings had or have "dark hair and eyes"; II. 4, 6 and 10 are alive, 6 suffering from senile dementia; II. 1 died of cholera; II. 2 at 72 of tubercle?; II. 3 at 66 of apoplexy; II. 5 of chronic rheumatism. That the albinism in II. 7 and 11 was as conspicuous as it is in II. 9 is proved by the history that when they were all children a travelling showman wanted to buy them all from the mother. I. 1 and 2 not fair, but the doctor who attended I. 1 told her, when he was an old man and had been in the district many years, that there had been albinism "three

¹ The albino is treated by other Congo natives with great respect. A woman who gave birth to an albino child was forced to enter the Ndembo, a secret society, which will be found described in Bentley's *Congo Dictionary*, p. 506. Dr Gamble says that some of the albinos are termed from their appearance "red men." He had heard of one at Nsumba and another at Kinsenda. These are probably xanthous negroes; see our chapter on Albinism of the Skin. Dr Gamble also refers to several other Congo albinos, e.g., Ntambu a girl of 10 at Lumweno, who belongs to same clan as above; a male albino at Ntiantete, a former chieftainess of Kinsenda, and the two cases of our Figs. 553 and 554.

generations before" in the family of her husband (I. 2). I. 1 and 2 not consanguineous in any degree. (Dr S. N. Cardozo, North Molton, Devon, November, 1908.)

Fig. 547. Three albinos in a sibship of ten. II. 4, fourth born, aged 19 (1885), hair very fair, skin rather rosy, iris pale blue but transmits red light from fundus, pupil acts well to light, fundus albinotic and disc seen with difficulty owing to want of contrast; V. $\frac{1}{8}$, not improved by any glass, marked horizontal nystagmus, bears daylight well and is not inconvenienced when obliged to work in the sun; is of strong constitution. II. 5, aged 11, exact place in sibship not stated, V. $\frac{1}{8}$, not improved by any glass, refraction not myopic, horizontal nystagmus; general appearances and degree of albinism just as in II. 4. II. 1, aged 23, an albino like the others; not seen. No particulars of the seven non-albinotic siblings except that some were brothers, some sisters. Mother, brown hair and good sight; father, very fair hair but sight quite good. No consanguinity and no other known albinism in the family. (Dr Bégue, *Bulletin de la Clinique Nationale Ophtalmologique de l'Hospice des Quinze-Vingts*, T. v., p. 194, 1885.)

Fig. 548. Two albinos in a sibship of nine. III. 9, aged 40, an albino woman, slightly weak minded, is able to earn her living as a charwoman, but is recognised as a "natural" or "imbecile." She has an illegitimate son, IV. 1, aged 21, who is said to be of average intelligence and properly pigmented; his hair is fair. III. 9 is a small feeble woman of about 5 ft. stature; she is microcephalic, greatest circumference = 17.5 inches; meatus to meatus 11.5 inches; occipital prominence to nasion 13.25 inches. Fingers short and somewhat clubbed (? brachydactylism). Skin on the face is smooth and glossy, on the arms dry and rough and show tendency to ichthyosis. Her hair, average in amount, is quite white, no yellow tinge; eyebrows and eyelashes white; irides are described as of pale pinkish yellow tint; convergent strabismus, most marked in L. eye; marked nystagmus, some photophobia but no myopia. Of her siblings, III. 1 is married; she is an albino as marked as III. 9, and in addition myopic—no record of any children if they exist; III. 2 is in New Zealand, she has red hair; III. 3 grew up to adult life, but died from a "general break up"; III. 4 in New Zealand, dark hair; III. 5, married (? children), dark hair; III. 6, married (? children), in New Zealand, sandy hair; III. 7, well grown intelligent man, light brown hair; III. 8 died as a baby three months old from some bowel complaint. The father, II. 1, of the sibship, a working man, became insane between 60 and 70 and remained two years in an asylum. He was brought home and died there without recovering the use of his senses. The mother, II. 2, had epileptic fits at 14 years of age and continued to suffer from them till she was 68, when she died from them, having been demented and helpless in her later years. II. 3, a cousin of II. 2 through her mother, died in an asylum. Nothing known of the grandparents. No record of cancer or tuberculosis in the family. (Sir James Crichton-Browne.)

Fig. 549. Two albinotic sisters in a sibship of four. The parents, I. 1 and 2, died early of tuberculosis; the two elder brothers, II. 1 and 2, not albinotic, died of cancer and tuberculosis respectively. II. 3 married II. 5 and had three normal children; she died, however, of phthisis, and her sister, II. 4, also albinotic, married the husband and has five normal children by him. The eight children, III. 1 and 2, of the two wives are without any congenital abnormality and of medium physique, one is now a soldier. II. 4, aged now 50, has been almost always healthy, although for some time she had marked haematemesis. All her hair is yellowish white; the iris pale gray and red; nystagmus marked, but it does not interfere with her sight except that if she supports her head from the side she is conscious of the movement of her eyes; photophobia and some short sight. (Dr Marhol, Kreis Iserlohn, Westphalia.)

Fig. 550. A fairly extensive pedigree showing cancer, insanity and albinism in the same stock. Much difficulty in obtaining information, and it is by no means certain that all the cases of albinism have been recorded, or that the cases of cancer have been quite correctly distributed. III. 3 and III. 4 are two sisters. III. 3 is an imbecile, somewhat microcephalic and suffering from centric nervous degeneration. III. 4 is a marked albino, hair with some diffused yellow pigment, eyebrows quite white, nystagmus, photophobia and myopia. The mother, II. 14, has three normal children by a second husband, II. 15. The father, II. 4, of the albino was first cousin of the mother. One of the father's brothers, II. 6, and one of the mother's brothers, II. 22, were insane, the latter also alcoholic. I. 11 died of tuberculosis; II. 11, a niece of the two grandmothers (I. 6 and I. 8), died of cancer; I. 2 and 4, I. 10, II. 1 (cousins of father) and two out of II. 13—21, the mother's brothers and sisters, also died of cancer. (Sir James Crichton-Browne.)

Fig. 551. A pedigree of family leucoderma. The reticence of the members of the family prevents as full particulars of this interesting case being provided as the recorder would wish. The members of the family speak of the family characteristic as "we go quite white." The sibship III. 4—13 consists of ten members. III. 4, 11 and 13 began to grow white when seven or eight years old, and are now 38, 28 and 22 respectively; III. 6 started whitening at 28 years and is now 35; in III. 12 leucoderma is just beginning to show itself at the age of 26. As III. 8 and 10 both died when 16 years old, it is not possible to say whether they would certainly have escaped. III. 5, 7 and 9, aged 36, 34 and 31 have so far escaped. Portions of pigmented skin are still visible on some of the affected, but III. 11 has not much that tans now. According to him, the whole of the skin of the affected individuals goes quite white, but in places the hair does not go as white as the skin; still all the affected members have white patches of hair; III. 11,

for example, has the middle of his moustache and a considerable piece on the left-hand side of his head white. II. 5, the mother, is said to have gone quite white, as well as her youngest, an unmarried, sister, II. 9. The grandmother also, I. 3, went quite white, the maternal grandfather and his siblings were normal. Of the other brothers and sisters of the mother three brothers, II. 2, 3 and 4, and one sister, II. 8, are married. They have 24 offspring, III. 1, 2, 3 and 14, and neither parents or children have shown so far any sign of leucoderma to the knowledge of my informant, III. 11. An unmarried uncle and aunt, II. 1 and II. 8, have also not developed leucoderma. If the information be correct on this point, then it would follow that in this family the tendency to leucoderma does not descend through the normal, but only through the affected members. III. 11 says that the whitening is not accompanied by any pain whatever, but the exposed whitened parts may blister rather painfully with the sun in summer—a feature of the albinotic skin also. The family as a whole is rather delicate, high strung and nervous. Yorkshire dalesmen, farming class. (K. Pearson.)

Fig. 552. Two sisters, II. 2 and 4, born of normal parents, themselves normal, and married to normal husbands, have: II. 2, one daughter and five sons, one son, III. 3, being an albino; and II. 4: four daughters and one son, the son, III. 11, being an albino. The order in the sibships, the mother's siblings, the exact character of the albinism, and the consanguinity, if any, not recorded. There are no other cases of albinism known in the family; the siblings of the albinos are all fair rather than dark, but none of them are said to have bad sight except III. 3 and 11. (Dr R. J. Ryle.)

Fig. 553. Twin albino negresses, II. 3 and 4, at Kimpangu, four hours from San Salvador, Portuguese Congo, were married to one man, II. 5, and all three died of small-pox, presumably without offspring. It is not known whether these twin albinos had other siblings. They had a dwarf cousin, II. 1. The recorder suggests that they may be the albino twin girls seen by Bentley at Lemvo and suggested as suitable wives for a missionary by the native chief: see W. A. Bentley, *Pioneering on the Congo*, Vol. 1., p. 200. (Dr Mercier Gamble.)

Fig. 554. A normal negress, II. 2, born of normal negro parents, and residing at Lungeji, four hours from San Salvador in Portuguese Congo, has an albino baby, III. 1, named Makani, which is described as "a fine fat healthy little 'Saxon' with pink skin, fair curls and light blue eyes which do not like the sunlight" (see Plate EE, 98, 99). The father, II. 3, is a pure negro. III. 1 is at present the only child and both parents are ignorant of any case of albinism in their stocks. (Dr Mercier Gamble and the Rev. P. R. Lourie¹.)

Fig. 555. Four albinos among members of the same stock. III. 6, typical albino, licensed pedlar; hair quite white (sample), photophobia, manifestly myopic in considerable degree, but will allow no examination, horizontal nystagmus, rate about 150 per minute to L. and 140 to R., but rate irregular; colour sense normal; pupils pink, iris variable from bluish-gray to reddish-purple or violet. He has been in St Bartholomew's Hospital for a broken wrist in 1892 and at present (January, 1909) is in the London Hospital with fracture of ankle²; intelligent man who provided most of the information. He is married and has had five children; IV. 12, 14 and 15 died young; IV. 13, now 8 years old, is fair, and IV. 16, six months old, is very fair. He has an albino sister, III. 8, aged 29, who is a typical albino, and was married four months ago; nystagmus, 96, mostly to L, but also rotatory, not very myopic. He has not known his cousins, III. 10 and 11, but his mother told him that they were albinos like himself. Of his normal siblings: III. 1 is "fairish" and has no offspring; III. 2 is dark but has six children, IV. 1—6, all fair, except IV. 2, who is dark; III. 4 is rufous (described as "carrot") and has five children, IV. 7—11, all fair. I. 2 had been seen by III. 6 who says she was dark, as also his own mother, II. 2. Father, II. 1, Scotch, died of bronchitis and lung complications. Whether the two maternal albino cousins were the offspring of a brother or a sister (II. 3) of his mother is not known. *No consanguinity.* (Dr W. Bulloch, January, 1909.)

PLATE XLVIII. Fig. 556. One albino woman, III. 3, aged 33, in a sibship of five; nystagmus, myopia, hearing good, skin reddish, hair yellow white; married to III. 6, a man with brown hair, and she has a single child, born in 1907, IV. 1, who has brown hair and blue eyes. Of her siblings, III. 1 was still-born; III. 2, aged 35, fairhaired and blue eyes; III. 4, aged 29, brown hair, blue eyes; III. 5, aged 26, fair hair and blue eyes. The father, II. 6, aged 78, is now brown haired, but originally fair, he has blue eyes. He is not related to his wife, II. 10, who died, aged 41, she had brown hair and blue eyes. Of the father's siblings: II. 1 fair hair and blue eyes is dead; II. 2, fair hair and blue eyes, dead; II. 3, fair hair and blue eyes, died aged 82; II. 4, black hair and blue eyes, died aged 74; II. 5, originally fair, now brown haired, blue eyes, living, aged 82. The mother's siblings are: II. 7 died aged 68, brown hair and

¹ Mr Lourie informs us that the name for albino in the Portuguese Congo is NDUNDU, which is the nearest approach we have found to the source of the 17th century Dondo.

² Appears to be a case of *fragilitas ossium*. (Is it possibly associated with albinism? See Fig. 143.) On inquiry it is found that, in 1892, the injury was from the handle of a barrow, and so slight that the albino could not believe the wrist broken. In 1908 the ankle was broken in stepping off a 'bus at rest, when he skidded, owing to an indiarubber heel, on to his side; he was surprised again to find the fall resulting in a breakage. K. P.]

blue eyes, married (? offspring); II. 8, dead, married (? offspring), brown hair and blue eyes; II. 9, living, aged 67, brown hair and blue eyes, married (? offspring); II. 11, living, aged 61, brown hair and blue eyes; II. 12 and 13 both died aged about 15, cause of death, hair- and eye-colour unknown. Paternal grandparents, I. 1 and 2, were first cousins; I. 1, fair hair and blue eyes; I. 2, dark hair and blue eyes. The maternal grandparents were also first cousins; I. 3, dark hair and blue eyes, I. 4, dark brown hair and blue eyes. Thus all recorded members of the stock have blue eyes, two, however, have dark hair¹. (Dr H. Richter Vennesleiren, Norway, through Dr V. Magnus.)

Fig. 557. Two albinos in a sibship of seven, grandchildren of an albino. III. 4, a complete albino, aged 22; III. 9, complete albino, aged 14; their siblings are III. 5, aged 20, blue eyes and ash blond hair; III. 6, aged 18, and III. 7, aged 17, both blue eyes and dark blond hair; III. 8, died at 4 months, blue eyes and fair hair; III. 10, died at 5½, blue eyes and fair hair. Their father and mother are not related; the former, II. 8, about 50 years of age, has ash blond hair, reddish beard, blue eyes and bad sight (?partial albino of rufous type); the latter, II. 9, having ash blond hair and dark blue eyes, was the illegitimate and only child of an albino mother, I. 3. Of the father's siblings: II. 1, a dark blond is married and has one dark-haired girl, III. 1; II. 3 is married to a second cousin, II. 2, she has blue eyes and is a dark blond, she has one very fair-haired boy, III. 2, with white skin, of very nervous constitution; II. 4, a tramp and chronic alcoholic, disowned by family, married, but number of children unknown; II. 5, dark blond with blue eyes, unmarried; II. 6 and 7, both insane as young adults²; I. 1 and I. 2 were both normal. (Dr Vilhelm Larsen, Tönsberg, Norway, through Dr V. Magnus.)

Fig. 558. One albino in a sibship of four, III. 6, aged 9 months, strabismus convergens dexter. His siblings, III. 3, aged 5, III. 4, aged 4, and III. 5, aged 2, are all fair-haired and blue eyed. The father, II. 3, aged 38, fair-haired and blue eyed, is not related to the mother, II. 7, aged 37, also fair-haired and blue eyed. Of the father's siblings: II. 1, aged 47, is single, normal, and in America; II. 2, aged 40, has black hair and blue eyes, he is married and has five non-albinotic children; II. 4, aged 35, is single, normal, and in America; II. 5, aged 33, is normal, married, and has two normal children; II. 6, four non-albinotic infants, died at 14 days, 3 weeks, 3 months and 5 years old. Of the mother's siblings: II. 8, aged 35, normal, married, has two normal offspring; II. 9, aged 29 years, light yellow hair, light blue eyes, is an imbecile and dwarf; II. 10 died the one at 14 days, and the other at three years of age, neither albinotic. The paternal grandparents, I. 1, died at 59, I. 2, living, aged 76, were normal, and first cousins. The maternal grandparents, I. 3, aged 81, and I. 4, aged 68, are normal, and first cousins *once removed*. I. 1 a is a congenital idiot, sister of the paternal grandfather who died at six years old. (Dr K. P. Mortensen, Bryggen, Norway, through Dr V. Magnus.)

Fig. 559. One albino in a sibship of four. III. 4, aged 49, single, albino; III. 3, aged 51, dark brown hair and blue eyes; III. 5, aged 45, fair-haired; III. 6, died of meningitis when two years old, dark brown hair. Father, II. 4, died aged 70, fair-haired and blue eyes; mother II. 5, died at 67, of *tumor colli*. Of the father's siblings: II. 1, dead, asthma, phthisis; II. 2, aged 70; II. 3 in America; the ten offspring of these brothers all normal. Of the mother's siblings, five are living between 60 and 70 years old, with families of four, three, four, three and six children, all normal; six are dead at unknown ages, two with families of five and four normal children; II. 14, insane at 25, and II. 15 married, but nothing known of offspring; II. 6 both died without offspring. The four grandparents, I. 1—4, all died in old age, and were not albinotic, no other case known in family. (Dr Fr. Abel, Skien³, Norway, through Dr V. Magnus.)

Fig. 560. IV. 2, an albino woman who died at 26 of pulmonary tuberculosis; she was good looking, very intelligent and musical. IV. 1, her only sibling, died at 18 of pulmonary tuberculosis, he was a dark blond with blue eyes. IV. 2 married a black-haired non-related man, IV. 3, who died of pulmonary tuberculosis also, and had four children: V. 1, *living*⁴, aged 14, not albino; V. 2, a twin, died at 14 months, not albinotic; V. 3, the other twin, an albino, died at one month; she had white hair, nystagmus and photophobia; V. 4 died at three years, not albinotic. IV. 2's father's sister married IV. 2's mother's brother and had four sons. Of these, IV. 4 has ash blond hair and beard, white skin, nystagmus and photophobia, he is married and had three children, of whom the first died at 22, the second at two, and the third at six months, the first was a dark blond, the second and third fair-haired, all had blue eyes. Of IV. 4's siblings: IV. 5 is 53 years, dark blond, blue eyes; IV. 6, 49 years, dark blond and blue eyes. IV. 7, black hair, dark blue eyes, is blind and deaf. The four common grandparents of IV. 2 and IV. 4 were normal, but the father, I. 1, of one of them, II. 3, was an albino with full characters. (Dr Vilhelm Larsen, Tönsberg, Norway, through Dr V. Magnus.)

¹ In the same place is an albino male with two albino siblings, one of these is married and in Bergen, the other in America; no further details.

² By a slip of engraver, the star appears to be transferred in pedigree from II. 6 to II. 8.

³ Two other families with albinos heard of in this district, one with living albino girl, the other with an albino boy, with an albinotic sibling, both dead. Further enquiries being made.

⁴ There should be no star to Fig. 560, V. 1.

Fig. 561. III. 1, a complete albino, who died in August, 1908. He was married and had nine non-albinotic children, IV. 1, four of whom are married and have 15 non-albinotic children, V. 1. The albino, III. 1, was the only son of II. 1, blue eyes (hair?), who died very old, and II. 2, his first cousin, who died aged 100, blue eyes and fair hair. II. 3, dead, had many non-albinotic children; II. 4 had five children, three, III. 4, died as infants, III. 5, living, has seven normal children, III. 6, has six normal children, one of these, a son, IV. 4, has married an unrelated woman and has three children, two of whom, a boy and a girl, are albinos. The four grandparents of III. 1 were all normal, and neither marriage was consanguineous. (Dr A. G. Vaage, Løiten, Norway, through Dr V. Magnus.)

Fig. 562. A case of unilateral white eyelashes and tufts of hair in a sibship of five. V. 10, female, aged 3 (1906), seen, born at full time, no instruments used; no asymmetry of face; hair light brown, except two white tufts on left side of head, no cicatrix in skin beneath; brows very light brown, left brow lighter than right, and has small pigmented mole; lashes on right side light brown, on left side quite white on both lids and well developed (see our Plate II. 109), no blepharitis, body hair nearly white; skin blond; four small marks—2 mm. diam.—at centre of forehead, smooth, only one to right of midline—no fall, herpes or inflammation; iris, light blue; pupils black, but after atropine the dilated pupils show red reflex, which had been noted by parents, no nystagmus; refraction low H.; fundus not particularly pale (white lashes and tufts of hair were noticed three days after birth). Mother (IV. 21), brown hair, blue eyes, skin blond, fundus not pale, had five pregnancies. V. 7, died of convulsions $3\frac{1}{2}$ months, "hair very fair"; V. 8, still-born; V. 9, male, aged 5 years¹, hair light brown, iris blue, fundus very pale and indistinguishable from that of an albino, no nystagmus; V. 11, hair brown, iris blue, aged nine months. Father (IV. 11), hair light brown, iris blue, fair complexion. The grandparents (III. 3, 14 and 16), were fair, *i.e.* they had fair hair or blue eyes or both, but III. 12 was dark; II. 10, fair; II. 3, 13 and 20, dark, also II. 22; I. 2, dark; II. 1, 2, and 7 to 10, known to be fair, and II. 17, dark; III. 2, 4 and 15, fair; III. 1, 6, 7, 11 and 13, dark; IV. 2, 6, 8, 9, 12, 14 to 16 and 18, 19, 20 and 22 to 24, fair; IV. 12 *a*, hair light brown, eyes blue; IV. 7, 10 and 13, dark; IV. 18 *a*, "jet black"; IV. 20 *a*, "coal black"; IV. 19 *a*, hair dark brown, eyes brown, all three dark complexions; V. 3 to 5, 12 to 16 and 22, fair; V. 6 and 17 to 21, dark. No evidence to show that any of the fair members on either side of the house were albinos. (C. H. Usher, *Ophthalm. Soc. Trans.*, Vol. xxvi., 1906, p. 23.)

Fig. 563. Four perfect albinos in a sibship of 12, and one, probably two, in ancestry. IV. 8, aged 23 (1908), complete albino, hair and eyelashes "the whitest of the white," irides blue but quite translucent, nystagmus, severe photophobia, can hardly face ordinary daylight in November, refraction M. As. but degree not measured, V. $\frac{3}{60}$ and 14 J. with each eye; fundus very albinotic; pupils very active. IV. 10, now 18, was first seen some time ago, conditions apparently exactly like the last, and refraction about the same (amount not measured), but sight not quite so bad, V. $\frac{6}{60}$ and 10 J. IV. 11, aged 17, resembles the two last and has similar refraction (not measured), V. $\frac{4}{60}$ and 14 J. IV. 14, aged 10, reported to be "white" but is in a home and could not be seen. Of the eight siblings, the youngest (IV. 17) aged 2, is fair with blue eyes but not an albino, and has H. refraction (too restless for estimation of quantity); IV. 9, who died at two years old, had red hair, and 16, aged 5, has red hair and blue eyes; IV. 6, aged 25, 12 aged 15, 13 aged 12, brown hair with gray eyes; 7, aged 24, and 15, who died aged six weeks, dark hair, and 7 has brown eyes. V. 1 and 2, each aged six months, blue eyes. IV. 6 has some M. As. but V. uncorrected is $\frac{6}{24}$ in the R. and $\frac{6}{18}$ in the L.; fundus shows nothing special. Mother (III. 5) died two years ago at birth of IV. 17, had dark hair and eyes; she was one of five of whom III. 1 was dark and had five children, IV. 1, two dark boys, IV. 2, two fair girls, and IV. 3, a "kind of fair" boy; III. 2, fair, married a red-haired wife and has all red-haired children (IV. 4); III. 3, no issue; III. 4 has children, all dark. Mother's father (II. 2) was "white," no further details; no information about his parents, but he had an aunt (I. 3), who was "blind from whiteness." Mother's mother (II. 1) was dark. Father's parents, still living, are now gray but formerly had "jet-black" hair. Father had two dark-haired sisters (III. 7 and 8) whose children are "jet-black." (Dr John Rowan and Sister Laura, Glasgow, November, 1908.)

Fig. 564. Five albinos in a sibship of nine born alive and three miscarriages. Three of the albinos seen, two dead. IV. 1, aged 19 (1908), typical albino with red pupil, blue translucent iris through which the edge of the lens can be seen by direct ophthalmoscopic examination; nystagmus; refraction moderate, myopic astigmatism, M. about 5 D. and 3 D., V. with and without his spectacles $\frac{6}{60}$; unaided reads 6 J., fundus typically albinotic. IV. 6, aged 11, and IV. 8, aged 8, are almost exact counterparts of IV. 1, but with rather worse sight ($\frac{2}{60}$ and 12 J.); irides translucent and allowing edge of lens to be seen, nystagmus, myopic astigmatism (degree not measured), typical albinotic fundus. Mother (III. 5) seen; red hair, brown eyes, good sight; her mother (II. 1), very dark hair, brown eyes; her father (II. 2) dark hair, blue eyes; an aunt (I. 1) of II. 1 had dark eyes. III. 5 is one of five; III. 1 and III. 3, dark hair, brown eyes, III. 2, red hair, blue eyes, III. 4, red hair, brown eyes. The miscarriages were IV. 7, 11 and 12, the

¹ "Months" in *Ophthalm. Soc. Trans.* should be "years."

two latter in May and September, 1908. Father (III. 6), brown eyes, good sight; his mother (II. 3), an only child, red-haired, her mother (I. 2) dark hair and eyes, both had good sight; father's father (II. 4) dark eyes, hair now gray. III. 6 is one of six, of whom III. 7, 8 and 9 have dark hair and eyes, whilst III. 10 and 11 are red-haired with blue eyes. (Dr John Rowan and Sister Laura, Glasgow, November, 1908.)

PLATE XLIX. Fig. 565. Two incomplete albinos and another doubtful one in the same sibship. IV. 38, female, aged 38 (1908), seen, intelligent, often called "blin'-fair"; hair sandy-gray, formerly light yellow; lashes and brows much fairer than hair; skin fair sometimes freckles; no nystagmus; no photophobia; iris blue; pupils red; right internal concomitant strabismus; refraction R. H. 2.25 D. oblique meridian and 3.25 D. in other principal meridian, V. with correction $\frac{5}{8}$ partly; L. H. 1.75 D. oblique meridian and 3.25 D. in other principal meridian, V. with correction $\frac{5}{8}$ partly; fundus albinotic, almost white in places; married, first child (V. 14) died at six weeks; five other children, V. 15, hair dark, blue iris, fundus not light; V. 16, hair sandy-reddish, iris blue, fundus light; V. 17, dark, ob. 4; V. 18, hair sandy, iris blue, fundus not pale; V. 19, aged ten weeks, fair, no nystagmus. IV. 40, male, aged 31 (1908), seen, married for two years, no offspring; hair almost white, very faint yellow tinge, brows, lashes, moustache all very light—a pale yellow; skin fair, no freckles, on left brow a blueish telangiectatic circular swelling 8 to 10 mm. in diameter, several smaller ones elsewhere; iris light blue; redness of pupils seen with difficulty; no nystagmus; refraction R. and L. H. .5 D. in oblique meridian, and 4 D. in other principal meridian, V. with correction 1 J. at 12"; fundus not particularly light, less light than his sisters (IV. 38). Father (III. 11), hair gray, formerly brown, iris blue, fundus not pale. Mother (III. 28), hair gray, formerly brown, dark brown lashes and brows; iris blue-gray; fundus not pale. II. 2, hair and eyes medium shade of brown. II. 7, hair brown. II. 11 and 13, hair dark. II. 12, 14 and 15, hair dark, red and auburn respectively. I. 1, 2, 3 and 4, no particulars as regards pigmentation, but they were not albinos. IV. 39, hair reddish, eyes blue, his four children (V. 20 to 23) not albinotic. IV. 41 dark, ob. 8. IV. 42, hair brown, child (V. 24), not albinotic. IV. 43, hair brown, two children, V. 25 ob. and V. 26; with blue iris. IV. 44, miscarriage. IV. 45, fair hair, iris blue, no nystagmus or photophobia, "weak eyes," looked upon by relatives as being one of the fair ones. IV. 46, brown hair, blue iris. IV. 47, hair brown, iris blue. II. 1, not very fair, no particulars of descendants (III. 1 and 2; IV. 1 to 5, and V. 1 to 3), but none albinotic. II. 4, hair brown, good vision. II. 3, good vision. II. 5, good vision, children (III. 3 to 7), hair brown, none with defective vision. IV. 6 to 9, none albinotic. V. 4 are fair. II. 10, not albinotic, his children's (III. 17 to 20) hair not fair. III. 21, none albinotic. III. 8 to 10, and 12 to 16, none very fair, also none of their descendants (IV. 10 to 36 and V. 5 to 13) are very fair. IV. 35, ob., six fingers on one hand. III. 22 to 27 and 29, all dark and none of their descendants (IV. 48 to 53 and V. 27 to 33) had very fair hair or defective vision. (Dr W. Clark Souter, December, 1908. IV. 38 in 1901, and IV. 40 in 1903, were seen by Dr J. R. Levack, who noted then that they were albinos and the condition of the refraction as stated.)

Fig. 566. A single partial albino (V. 6) in a sibship of four, the issue of first cousins. No other albinos known in an extensive pedigree. V. 6 seen by E. Nettleship in January, 1893, aged 11, and case recorded in *Royal London Ophthalmic Hospital Reports*, xv. p. 117, Case 4; hair very light but far from white, but was almost white in early childhood; irides light blue, translucent to light, the translucency being much more pronounced when the pupils are contracted; pupils slightly red; choroid appeared perfectly albinotic from the equator forwards, every vessel on that part being seen with absolute distinctness owing to absence of pigment, but the posterior part was bright red and of the normal velvety appearance, no separate choroidal vessels being visible, and one could not say with certainty that this part was more devoid of pigment than some very fair normal choroids; this area was much larger than is usual in albinotic eyes and the transition from it to the obviously albinotic portion singularly abrupt; lateral nystagmus of moderate rapidity and range with lateral oscillation of head; refraction highly H. (R. 4.5 D., L. 6 D., with not more than 1 D. of As. in each), V. corrected $\frac{6}{80}$; the nystagmus said not to have been noticed till six months after birth when he had whooping cough. Seen again when 17 (1899), H. slightly lower. V. corrected $\frac{6}{36}$ each eye; other conditions as before. Fully examined again by Mr J. F. Cunningham in 1908, aged 26 or 27; condition not sensibly altered except that the hair has darkened and is now light brown; nystagmus as before, head still oscillates sometimes; refraction R. H. 4 D. with 1 D. of As. horizontal, L. 5 D. and same As., V. corrected $\frac{6}{36}$; irides still translucent and fundus as before. Has worn spectacles nearly his full correction, since he was 11. Of his three siblings V. 5 died of whooping cough at about two years old, was fair with blue eyes, born about two years before V. 6; V. 7, dark hair and eyes, two years younger than 5; V. 8, two years younger, irides blue-gray, not translucent, fundus normally pigmented, hair dark brown. Mother (IV. 8) dark hair, gray eyes, married at 34, no miscarriages or still-births, died at 60 of bronchial and heart affections; she had four siblings, their eyes from gray to blue and at least two had fair hair. Father (IV. 23), first cousin of mother, aged 30 at marriage, hair nearly black, eyes gray, fundi rather dark; of his five siblings, two blue eyes and fair or red hair, one dark. Mother's father (III. 7), fair according to portrait. IV. 8 and 23 had good health whilst their children were coming. A great preponderance of blue or gray eyes over dark ones in

Generations III., IV. and V. (about 70 to 15), about half the blue- and grey-eyed ones with fair hair, half with various shades of brown. One (V. 19) "very fair" with blue eyes, his father (IV. 24) being also fair. III. 7, who married twice, was not related to either of his wives, but they (the wives) are said to have been related to each other in some degree; and of their grandchildren V. 1 married his half-first cousin, V. 12; no consanguinity between albino's paternal grandmother, III. 12, and her husband, nor between the great-grandfather, II. 3, and his wife, nor are any consanguineous marriages known of in the earlier generations. The pedigree of II. 3 is known in one line for six generations backward, and of the siblings of II. 3 for four generations forward, without any discovery of albinos. Also other fourth cousin collaterals of II. 3 known, all normals. (Pedigree and all recent information from Mr J. F. Cunningham, January, 1909. Original description of the albino by E. Nettleship, 1893 and 1899.)

Fig. 567. Natives of Rotuma¹. One incomplete albino and one complete albino in the previous generation. IV. 2, female (Louisa), aged 15 (1908), seen, a thin anaemic debilitated girl, in size looks her age, but breasts not developed and other signs of puberty have not appeared; hair light dirty brown; skin very fair and slightly freckled; iris light gray; no suggestion of intermixture with white blood. III. 3, aunt of IV. 2, died aged 15, an albino, not seen. Mother (III. 1), and sister (IV. 1), of IV. 2 normal natives with dark brown eyes. III. 4, normal male native had seven children (IV. 3) all dead. III. 6, normal female native has four normal living children (IV. 4). Maternal grandmother (II. 1) of IV. 2, normal native, also her mother (I. 1) normal. (Dr John Halley, February, 1909.)

Fig. 568. Three albinos in a sibship of six, the family being Russian Jews. The informant, III. 11, was an intelligent Jewess speaking German well. Of the sibship, IV. 3 and 4, are very fair (*hellblond*) but not albino; IV. 5, an albino died, aged $4\frac{1}{2}$ years, of some chest trouble. IV. 6, female albino, aged 4, white hair, pink pupils, greyish blue irides. IV. 7, female, very blond, but eyes not pink; IV. 8, aged $1\frac{1}{4}$ years, female albino; irides blue, pupils pink in diffuse daylight; nystagmus slow, and chiefly to left and upwards; hair, specimen sent, light yellow. The mother, III. 11, dark hair and eyes; the father, III. 6, was *hellblond*, but not an albino. Of the mother's siblings, III. 7, 9, and 13, and their offspring, IV. 1, 2, 9, little to be elicited except that they are in Russia and not albinotic. The father's three siblings, III. 3—5, are all *hellblond*, but not albinos. I. 1 and 2 not known to III. 11; II. 2 and 3, two *hellblond* brothers, the former having two albino daughters, III. 1 and 2; living in Russia and possibly now married; the exact degree of albinism could not be elicited, but III. 11 said they were like IV. 8. The mother's parents, II. 5 and 6, described as of medium colour. (Dr W. Bulloch, 1909.)

Fig. 569. Three Papuan albinos in two sibships of same generation. II. 1, woman (Goomica) albino, no particulars, died some years ago. Mother (I. 2), normal coloured native, dead. Father (I. 1), normal coloured native. II. 4, boy (Drinda) albino, intelligent, attending mission school, would be taken for a white child by a casual observer, several small sores on body and ear. II. 5 (Uridi), albino infant in same sibship as II. 4, both first cousins of albino II. 1. Mother (I. 3), and father (Keriboai) (I. 6), natives with normally coloured skin. I. 4, brother of I. 3, has normal skin. No albinos on father's (Keriboai, I. 6) side. (Rev. John Hunt through Dr Jones, January, 1909.)

Fig. 570. The albinos were two in a sibship of five, and were separated by two normal siblings. Whether II. 1 was the eldest or youngest in the sibship, not stated. In II. 2, the vision was $\frac{20}{100}$, and in II. 5, $\frac{20}{500}$. In both there was pronounced nystagmus; refraction H. but amount not given; fundus very albinotic. (Magnus, *Die Jugendblindheit*, S. 54, Wiesbaden, 1886.)

Fig. 571. Boy born of Jewish parents. Complete want of pigment when examined soon after birth, dark red pupils, light red irides, blood in retina and choroid visible, light flaxen hair and almost white eyebrows; photophobia, but seeing well at dusk; nystagmus; seen several weeks later, writer believed a secretion of pigment to have commenced; he found pupils light red, irides violet, and between the white streaks of the iris, red colour (there appears no definite evidence of a pigment secretion in this account). The father was blond, and the mother not. No further information as to relatives. (Anon., *Journal für Chirurgie u. Augenheilkunde*, "Fehler in der Pigmentabsonderung," Berlin, 1850, Bd. xxiii. S. 52.)

Fig. 572. Two complete Maori albinos in the same sibship, and a doubtful incomplete Maori albino in another related sibship, not definitely linked on and so not on figure. II. 2, male Maori (Henare Hemara), (age ?) an adult; hair yellow; skin more yellow than white; iris light hazel; pupils red; nystagmus; divergent strabismus of R.; photophobia; his features those of a Maori; married II. 1, a normal Maori, "has some fine children," III. 1 and 2, "not in any way different from ordinary Maori children." II. 3, female albino, dead, resembled her brother, II. 2. Mother (I. 2), living, pure Maori, and father (I. 1), pure Maori, in all probability nearly related. The albino II. 2, his mother, I. 2, wife, II. 1, and child, III. 2, are shown in Plate GG (103). (C. H. Usher, January, 1909.)

¹ An island 300 miles N.N.W. from Fiji.

Fig. 573. Two complete and one partial albino in a stock of which it was not possible to obtain very full information. No albinos traced in Generations I. and II., but no detailed account of collaterals available. The mother, II. 2, said to be delicate. III. 1, died aged six months; III. 2, extreme blondism; III. 3, when seen at age nine, hair all but white, irides quite gray and inner part yellowish or reddish, pupils moderately pink; refraction, myopic astigmatism, 4 D.; vision corrected $\frac{6}{30}$, unaided $\frac{6}{80}$; photophobia, nystagmus; nystagmus said to have been noticed within a few days of birth, and very bad for first six months, had lessened considerably. Seen again aged 15; refraction and vision as before, scarcely any more pigmentation, hair very fair flaxen, but photophobia had disappeared. III. 4, died aged 12 months; III. 5, died aged one month; III. 6, died aged 22, *status lymphaticus*; III. 7, aged 29, married to normal husband, III. 9, one child female, IV. 1, an albino, one child male, IV. 2, normal. III. 8, aged 21, normal. Said to be no family history of albinism, but mother very delicate before birth of III. 3. No further details as to hair- or eye-colour of recorded or other members of stock. (K. Pearson from various sources.)

Fig. 574. A negress, I. 2, in St Paulo de Loanda, had by a normal negro, I. 1, three albino children. II. 1, examined by Falkenstein, is thus described: "kein ganzweisses sondern weissblondes Haar, keine porzellan sondern rosafarbene Haut, welche zugleich leicht hypertrophiert von fellartiger Beschaffenheit war," suffering from convergent strabismus. No further details. (Falkenstein, *Virchow's Archiv*, Bd. xxii. S. 432, Berlin, 1877.)

PLATE L. Fig. 575. Partial albinism. This case was investigated in IV. 15, H. W. an outpatient attending Dr Head's clinic at the London Hospital. He was found to be suffering from nystagmus and partial albinism; he had also occasional fits. His statement that numerous members of his family were similarly affected was inquired into by Dr Bulloch, who constructed the pedigree from data supplied by IV. 15 and by his father, III. 18, an intelligent man; they produced a number of birth certificates and *in memoriam* cards. The details which IV. 15 gave of the family were corroborated by III. 18 in a separate inquiry. On March 26, 1909 the living members of this family, viz. IV. 15, 17 and 24 along with III. 18 were examined ophthalmoscopically by E. Nettleship whose report is incorporated.

I. 1 is said to have been a sturdy old fellow with "good eyes." I. 2, no information, except that she belonged to Essex. II. 2, 3 and 5 (the B.'s) had good eyes. II. 1, W. (the name of the partial albinos) had also good eyes. II. 1 and 2 had a family of 13, all of whom, except III. 13 and 15, are still alive at ages ranging from 87 downwards. III. 1, aged 87, good eyes, has had eleven children, six sons and five daughters of whom only the youngest, a daughter and a son, are dead. Four daughters and one son, *not indicated on the pedigree*, are married and have among them 34 children, of whom two were stillborn and one is dead. The whole of the children and grandchildren of III. 1 are normal. In fact the partial albinism has only appeared in the two branches in which cousin marriage has taken place. III. 3, alive, aged 83, good eyes, has six normal offspring, IV. 2. III. 6, alive, aged 81, good eyes, five normal offspring, IV. 3. III. 9, alive, over 70, had an illegitimate child by III. 7, and married twice, III. 8, and when over 70, III. 10; her offspring, IV. 4 and 5, are normal. III. 11, married, no family, over 70, good eyes. III. 13 died in childbed and had two normal offspring, she herself being normal. III. 15, good eyes, good position in a brewery, but "drank himself dead." III. 16, good eyes, two normal children, both married. III. 18 (H. W.) married his cousin (E. B.) III. 30, and is father of the partially albinotic sibship. He is a sturdy man, aged 58, a very intelligent navvy; eyes quite normal; irides gray with some dark brown spots on the pupillary part and slightly diffused pigmentation between the spots; choroid decidedly dark, the interspaces darker than the vessels; slight hypermetropia; sight good; hair now nearly white (senile), but was black and eyebrows are still almost black. He and his sons are of rather short stature (about 5' 6"), but well made and come from Essex. III. 19, over 50, has good eyes and three living normal daughters, IV. 27—29 and a number of children dead, IV. 30, mostly miscarriages and condition unknown. III. 21, living, good eyes, has five normal offspring, IV. 31—35. III. 23 married his first cousin, III. 24, both with good eyes; they have had at least four normal children, IV. 38—41, and six partially albinotic children; the eldest child, IV. 36, is said to have "weak eyes," which are not however "pink," he is married and has three normal children. The partially albinotic children, IV. 42, now all dead, are stated to have all had pink eyes. III. 26, alive, good eyes, has had miscarriages, number not known. II. 5 and 6 (B.'s) have had six children, III. 28, 30, 31, 33, 34, 36; thirty-three grandchildren, IV. 44, 46, 48, 50, 52, 53, 54—60, and seven great grandchildren, V. 4—10; all known to III. 18 and his sons, and stated to be normal as regards their eyes. In particular the children of II. 5 and 6 are all alive and each individually was stated to have good eyes. III. 30, the mother of the albinotic sibship, has very good eyes, dark hair; she has been always strong and has borne about twenty children.

Of the albinotic sibship itself all members are dead except IV. 15, IV. 17 and IV. 24. Death took place mostly in infancy (before six) from pulmonary troubles, but two died from diphtheria. According to III. 18 all had pink eyes exactly like IV. 15, except IV. 13, IV. 20 and IV. 22. IV. 12, died, aged 3; IV. 13, died, aged 1; IV. 14, died, aged 6½; IV. 16, died, aged 2; IV. 18, died, as child, "very bad

eyes"; IV. 19, died as child, "bad eyes"; IV. 20, died, aged 2; IV. 21, died, aged 2; IV. 22, died as baby, but good eyes; IV. 23, died, aged $\frac{9}{12}$; IV. 25, died, aged 3, pink eyes; IV. 26, miscarriages, about five or six.

Turning to the living siblings, IV. 15, aged 28, was examined at the London Hospital, 26 March, 1909. Hair lightish brown with sandy tinge, moustache ginger or more sandy than hair of head; eyelashes and eyebrows not white. Sight poor but no exact tests made, can read; nystagmus of moderate rapidity and considerable range, but not bad enough to prevent a cursory view of the optic discs; refraction myopic astigmatism against the rule in both eyes, but degree not measured. Irides looked at casually would excite no remark, being a light brownish gray, but examined in detail with magnification they show yellowish brown pigmentation of the stroma over the pupillary zone, the periphery being gray; the pigmented zone occupies about $\frac{1}{3}$ or in places $\frac{1}{2}$ the width of the iris. Illuminated with the ophthalmoscope mirror a faint red light is transmitted through the most peripheral part of the iris, but none at all through the remainder; but when light is concentrated on the sclerotic and front of the eye by a lens the iris appears quite red from light reflected from the interior and the pupil brilliantly red; the pupil is also quite red to ordinary inspection by daylight. Fundus very albinotic, the choroidal vessels very conspicuous and optic disc darker than the choroid. Very intelligent, but for 17 years liable to occasional epileptic fits,—about one fit in a year. His father says that the hair of IV. 15 and of all his children, was almost black at birth, becoming lighter in degrees later in childhood and then again darkening in some of them; it seems certain that none of this partially albinotic sibship have at any time been noticeably fair.

IV. 17, aged 24. Hair dull brown, decidedly darker than IV. 15; iris stroma more pigmented than his but extreme periphery gray; iris not translucent to illumination of sclerotic, but pupil becomes dull red; in daylight the pupil is grayish with a tinge of dull red sometimes; fundus not so pale as in IV. 15; refraction myopic astigmatism against the rule, amount not measured. Severe nystagmus and a high degree of alternating convergent squint. In spite of his eyes being as a whole a good deal less albinotic than his brother's (IV. 15), his sight is much worse so that he was educated in a blind school and learnt to read Braille; no detailed examination of the yellow-spot region however could be made and a special scantiness of pigment in that region could not be excluded.

IV. 24, aged 13, hair very dark brown; irides not very different from IV. 15's but rather more pigmented, periphery gray; pupils quite black both on illumination of sclerotic and in daylight; fundus moderately pigmented, not suggestive of albinism; no nystagmus, sight good, refraction emmetropic or slightly hypermetropic. (Drs Head and Bulloch, March, 1909, with report by E. Nettleship.)

Fig. 576. Gilbert Islands albino. There is only one male albino in this group of islands; he is a native of the island of Abemama, and is a full cousin to the present ruling chief. He is a complete albino, but would almost pass for a native of Northern Europe (see Fig. 104, Plate GG). I. 2, Karotu, had two wives, Nei Teā, I. 1, and Nei Kabubureñana, I. 3. Hiram Teeko, IV. 1, the albino referred to, is the great-grandson of I. 1, his mother being a second Nei Teā (III. 2) and his grandparent Tem Baiteke (II. 2). The other wife of Karotu had a daughter Nei Tetaorube (II. 4) whose child Nei Tokāti was an albino, who died some thirty years ago. The photograph of Hiram Teeko was given by Mr Murdoch to Dr Alex. Robertson, who transmitted it to C. H. Usher; specimen of his hair since obtained is reproduced on Plate K. (Mr G. M. Murdoch, August, 1908.)

Fig. 577. One male albino, III. 8, in a sibship of three. He is aged 32 and unmarried. He considers that he is certainly weak physically. As a boy ailed so much—inflammation of lungs, bronchitis, etc.—that he did not go to school till seven years old. Considered sharp at school notwithstanding handicap from eyesight. Has improved since 14 years, having little positive illness during the last 10 to 12 years; breathing is always a little unsatisfactory, and never quite free from a cough, which gets worse with slight cold; hair perfectly white, no tinge of yellow, hair grows strong and stubborn, shaving difficult; pupils pink, nystagmus, photophobia, myopia, and no relief by glasses; skin pinkish, and easily blisters badly in the sun. Stature 5' 6", very thin and only weighs eight stone; tendency to spinal curvature, which he counteracts by attending physical culture school. An intelligent clerk, with good knowledge of bookkeeping and business routine; mental powers good, but cannot study much after work hours on account of sight. The father, II. 1, was of very dark complexion, strong and robust, but died at 50 from an abscess. The mother, II. 11, had black hair and blue eyes, she is alive and has scarcely known a day's illness in her life. III. 7 died at 2½ years of meningitis, he had blue eyes and fair hair; III. 8, the albino, was two years younger; III. 9 has dark eyes and hair, he is strong and healthy, aged 25. Both parents came from the neighbourhood of Newark, Notts., but there was no consanguinity. I. 3 and 4 are dead but lived to a good old age, II. 11 says that I. 3 used to say that there had been a distant relative of his exactly like III. 8, but neither III. 8 nor his parents were able to trace this rumour back to its source; nor have they been able to discover any other albino in the stock. II. 11 says that I. 3 "seemed very dim and uncertain on the point." II. 11 has one sibling only who is married and has had eight normal children seven of whom are alive. The father, II. 1, was the eldest of five brothers, all

alive and married; II. 3 has three normal children; II. 5 has two normal children; II. 7 has been married twice, by the first wife, II. 6, who was tuberculous, there is a tuberculous child, and by the second a normal child; II. 9 has a single normal girl. I. 1 and 2 were normal and I. 1 is living now (1909), aged 82. (Karl Pearson.)

Fig. 578. Two albinos in a small pedigree and vague history of others in earlier generations. III. 3, aged 11 (1909), incomplete general albino; irides blue not pink; fundus light especially at periphery; but not typically albinotic; refraction considerable H. As. V. with + 2.5 D. cylinder $\frac{6}{18}$ each eye; nystagmus not mentioned. Her father's brother (II. 2) stated to be an albino, married, but no children. Father (II. 1) speaks of an albino or albinos in his mother's family but cannot give particulars. The albino III. 3 has four living siblings, III. 1, aged 17, dark hair, gray irides, III. 4, aged nine, light hair, brown irides, III. 5, aged six, fair hair, blue irides, III. 6, aged four, dark hair, blue irides; the second born, III. 2 died in infancy. No mention of consanguinity, and no mention of the mother who is dead; father has partial atrophy of optic nerves and imperfect sight but is not an albino; he either does not know or will not tell the family history. (Dr John Rowan, February, 1909.)

Figs. 579—590 embrace twelve families of Hopi and Zuñi albinos given by Aleš Hrdlička: "Physiological and Medical Observations, among the Indians of South-Western United States and Northern Mexico," *Bulletin 34, Bureau of American Ethnology, Smithsonian Institution*, Washington, 1908, pp. 195—7. These pedigrees are reproduced but they are very inadequate, and considerable doubt is thrown upon them by (i) the statement that the albino was the second born in 10 out of the 12 cases, and (ii) the generally very doubtful paternity among the American Indians. It is a pity that opportunity did not occur of more fully studying these albinotic families, and making much more complete and less superficially doubtful pedigrees. Ample anthropometric measurements are given in the original.

Fig. 579. II. 3, girl aged about 10 (1908), only albino in family, is third child; parents normal¹. Hair straight, unbleached flax colour, with slight golden reflex; eyes grayish blue, light yellowish about the iris; face pinkish white exactly as in many white blonds. Hands and feet slightly dusky from sunburn. Intelligence slightly below average.

Fig. 580. II. 3, girl about 14 to 15, second child in family; parents normal. Hair straight and flax colour, eyelashes and brows lighter. Eyes medium blue. Face pinkish white; hands and feet show effects of exposure. Not very bright in school, intelligence in general slightly below medium.

Fig. 581. Two albino girls in a sibship of six with normal parents. II. 2, a bright child, age not stated. II. 6, aged about six; hair straight of a very light flax colour; eyebrows and lashes very light, but not white. Eyes clear medium blue. Face very pinkish and blond, hands and feet somewhat darker, sunburnt. Features ordinary, not of regular Indian type.

Fig. 582. II. 2, Zuñi albino male about 35 years old, the seventh of eight children. Parents, siblings and all relations full coloured. Skin pinkish white, where exposed it is dusky and furrowed, neck much corrugated; face shows much sunburn, the forehead protected by the hair is white. The skin on the hands look like that after scalding. Hair, light brown; eyebrows and lashes are lighter. Eyes gray; some lateral nystagmus; eyes blink in light ("as in all the described albinos,"—this is the only reference to the photophobia which appears to have existed in all the cases). Features quite coarse, but body well developed; is left-handed. Married to normal wife, II. 4, and has one child, III. 1, full coloured. See Plate NN (125) and (126).

Fig. 583. Albino man, II. 2, about 55 to 60 years; is supposed to have been the second of four children; parents and siblings normal. Hair, straight and flax coloured. Face, albino type and wrinkled. Skin, colour pinkish as in others. Nystagmus. Intelligence fair.

Fig. 584. II. 2, girl between 15 and 16, second child and only albino in family of three; parents normal. Hair straight, medium to light yellowish brown; eyebrows and eyelashes light flax colour; eyes grayish blue. Face and body pinkish white as in European blonds. Sunburn on exposed part of limbs and on face. Intelligence not above and possibly slightly below average.

Fig. 585. II. 2, an albino male about 33 years old, second of five siblings of normal parents, no albino relatives. Hair straight, light brownish. Eyes, rather grayish than blue; face coarse, not Indian-like, resembles that of some epileptics; some strabismus, lateral nystagmus. Intelligence average, but not higher.

Fig. 586. II. 3, albino man, aged about 30, the second of four siblings. Parents normal, no albino relative. He is sexually potent, married, but his wife had no conception; was jealous and they did not live long together. Intelligence fair. Face slightly dull, not Indian-like in type. Hair straight, very

¹ Full colour normal Indians of the South-west and Northern Mexico = 21, 28 and 42 of Broca's scale.

light brownish; eyebrows and eyelashes nearly colourless; eyes grayish blue, lateral nystagmus. Lips thick and upper lip somewhat defective in middle line, notched, slight degree of harelip.

Fig. 587. II. 2, female albino, aged about 28, the second of five or six offspring of normal parents. Hair, flax to light brown colour, straight; eyelashes very light flax colour, eyes grayish blue. Skin, light pinkish white, hands and feet, quite small, somewhat sunburnt. Body, colour exactly as in European whites. Rather frail, but not emaciated; intelligence not very bright. Pubic hair thin, not very long, light flax coloured. Head normal as in all the albinos; shows quite marked cradle-board occipital flattening. Married three years to a full coloured Hopi, no conception.

Fig. 588. II. 2, albino girl, aged about seven, second child of three, born of normal parents; face quite bright, otherwise like other albinos. Hair, straight, and light brown. Eyebrows and lashes lighter. Eyes bluish. Skin like that of a white child. Cries and sobs at slight provocation.

Fig. 589. Two albinos in a sibship of six, born of full-coloured normal parents; no albino relatives. II. 2, second child, boy, albino, died. II. 3, male (Zuñi) albino, aged about 45. Colour of skin closely similar to that of whites, except on the face, where it is quite rosy. Hair, pale yellowish; eyebrows and lashes nearly colourless. Eyes light blue, and show continuous lateral nystagmus. Is well nourished and normally developed. Skin, however, of the face, neck, forearms and legs has a somewhat myxedematous appearance. Fair intelligence and good nature. Not married. See Plate NN (127) and (128).

Fig. 590. II. 2, albino woman, aged about 35, second of two children, born of normal parents. No albino relatives. Features regular, not Hopi-like. Hair, straight, of flax colour; skin, pinkish white. Eyes bluish. Intelligence fair. Has a male child, III. 1, by a full coloured Hopi. The child was seen, it was full coloured and looked like other normal Hopi children.

Fig. 591. An albino in one generation and another albino in the previous generation. IV. 3, a Syrian girl (seen 1909), age seven, born on Mount Lebanon; skin white, no freckles on any part of her; hair white; iris seems transparent; pupils pink, equal and active to light; marked nystagmus; photophobia; vision fairly good; no strabismus; intelligent, equal in ability to any of the other girls of her age. Father III. 1, and mother III. 2, are dark; they were distantly related to each other, as parents commonly are, according to Dr Manasseh, in Syria. They attributed the albinism to maternal impression, the mother meeting an albino who lived in the district when pregnant. Sisters (IV. 1 and 4) and brother (IV. 2) are dark, and hair black. None of her relatives like her except III. 3, a second cousin of III. 2, he was an albino, lost his reason and committed suicide, aged 30. (Dr A. J. Manasseh, March, 1909.)

Fig. 592. II. 1 is the albino Australian native figured in our frontispiece. He had two sisters, both black, and his father and mother were black. When the natives first mentioned the "white man" in the interior, they said, "all the same as white fellow only hair on body white," meaning that most white men they had seen had dark hair. Mr Alexander McPhee and others have given the data upon which we base the following description: Age about 30, colour of skin like a white man, much whiter than a half-caste¹; golden hair, almost white eyelashes; pubic hair profuse and extending over perineum. He had no difficulty in standing light of sun and no nystagmus was noted. The irides were brown, and the pupils pink. He was found in lat. 20, long. 123 more than 140 miles from Lagrange Bay on the North-Western coast of West Australia and taken by Mr McPhee for exhibition in the Eastern States (1890). McPhee brought in the albino's mother and other members of the tribe with him about 200 miles; the mother had never seen the sea before and this speaks for the isolation of the tribe. Another description runs: "He was a full-blooded aboriginal. His skin, where not exposed to the sun, was white; eyes brown with pink pupils, lower eyelashes bright colour; hair on head golden; on other parts of body a light sandy colour." The W. Australian Government after the albino had been shown in Melbourne and other places gave orders that he should be returned to his own country. In our chapter on *Geographical Distribution*, will be found fuller accounts of this and some other Australian albinos. We have to thank (1908) Dr Thom, Mr McPhee, Mr John G. Withwell, and others for particulars, and for the photograph of this W. Australian albino native. The yellow hair, as in all these cases, has photographed dark. The creasing of the skin has been noted in other aboriginal albinos. The chest marks are tribal marks.

Fig. 593. II. 1 and 2 were twin brothers born of Irish parents in the city of Chicago; complete albinos, hair and skin "cire" white, pupils red, irides pink, nystagmus and photophobia. No statement as to other siblings. The father, I. 1, examined had no pigment anomaly, and the mother, I. 2, said to be normal; no record as to consanguinity. Hyde says albinism is rare among Celts, and considers the short white hair of these twins differs from the long, soft, silky hair of most albinos (?). (J. N. Hyde: *International Medical Magazine*, Vol. 1. 1892, pp. 500—502. Philadelphia, 1893.)

¹ The simple comparison of our frontispiece with the photograph of a genuine Australian native, reproduced by permission from Hutchinson's *Living Races of Man*, vol. 1, p. 61, will show how certain it is that the albino is a full-blood native.

Fig. 594. II. 12, the mother of the albinotic sibship, aged 29, had as a child light yellow hair and was a blonde; at 16 her hair darkened; she suffered from chlorosis; her skin never tanned in summer however much she exposed herself to the sun; she was married at 25, and her pregnancies have been quite normal; she has now dark brown hair and eyebrows; her eyes are light blue and her complexion extremely fair. The father, II. 15, aged 37, neurasthenic; healthy as a boy when his hair was so pale, that he was called white haired; hair now light brown, eyes light blue; he is colour blind (examination to take place). In the albinotic sibship, the eldest, III. 3, aged 3, has dark blue eyes, the first hair was very pale, now the hair is grey yellow. III. 4 is aged 2, and was 9 lbs. at birth; snow white hair in great profusion; eyes closed for first 8 days after birth; red pupils and irides, nystagmus; has rachitis. III. 5, aged 1 year (born within a year of III. 4), has red pupils and irides, snow white hair and nystagmus. Of the parents' relations the mother's siblings are: II. 2, died of typhus, aged 37, hair dark brown, blue eyes, married II. 1, a brown-haired woman and had a single brown-haired son, III. 1; II. 4, aged 42, black hair, dark blue eyes, healthy, just married; II. 5, accidentally drowned, aged 16, healthy, brown hair and blue eyes; II. 6, brown hair and blue eyes, lived only a few months; II. 8, brown hair, blue eyes, aged 36, married, but without children; II. 9, brown hair and blue eyes, died after 6 months' illness, aged 23, of pulmonary tuberculosis; II. 10, aged 34, brown hair, blue eyes, highly nervous, married, with three normal children, III. 3, all with dark brown hair. The father's siblings are: II. 13, aged 40, dark brown hair and light blue eyes, healthy and strong, married; his four sons have all blue eyes, the third is blond, and the other three have dark brown hair; II. 16, healthy and strong, aged 34, married¹, with one daughter, III. 7, blond hair and blue eyes; the father has four half siblings: II. 18, aged 21, very light yellow, nearly grey (ash-blond) hair, light blue eyes; II. 19, aged 19, ash-blond hair and blue eyes, very fair complexion; II. 20, aged 17, light yellow hair, blue eyes, fair complexion; II. 21, aged 10, normal. I. 4, the paternal grandfather, aged 65, has brown hair and blue eyes; I. 3, was not related to him, and the cause of her death not known. I. 1, the maternal grandfather, died at 62, of post traumatic tumor cerebri, which made him nearly insane at times, dark brown hair and blue eyes. I. 2, maternal grandmother, aged 73, brown hair and blue eyes. There were no consanguinity and no other cases of albinism known in father's or mother's stocks. (Dr V. Magnus, Christiania.)

Fig. 595. An incomplete albino in a sibship of seven: II. 2, male, aged about 16 (1908) seen, a farm worker, hair fair, skin blond, iris blue with yellow spots at corona, marked constant lateral nystagmus, media clear, fundus normal, but pale. II. 3, aged 14 (seen), brown hair, blue iris. II. 4, fair hair and blue eyes. II. 5, dark hair, brown eyes. II. 6, very fair, blue eyes. II. 7, hair light brown, blue eyes. Father (I. 1), hair sandy, iris blue. Mother (I. 2), dark. It was said by I. 1 and 2 that none of their relatives are albinos. (C. H. Usher; May, 1909.)

PLATE LI. Fig. 596. Three complete albinos in a sibship of eleven, three complete albinos in two other sibships of same generation, two complete albinos in different sibships of the previous generation. V. 27, male (seen), age 20 (1909), an intelligent clerk, hair white, eyebrows and lashes white, skin blond, reddens with sun, no freckles, iris blue, pupils red, constant lateral nystagmus, marked involuntary lateral movements of head, photophobia, defective vision, glasses worn formerly did not help him, he is strong and healthy as other members of family, good temper. V. 26, his brother, is just the same as he is as regards skin, white hair, blue eyes, and defective vision; V. 24, fair hair and skin, and very shortsighted. Mother, IV. 24, youngest in sibship of eleven, aged 58 (1909), seen, iris blue, hair light brown, but so fair in childhood that she was called "Kirsty bahn." Father, IV. 10, youngest in sibship of seven, eyes blue, hair fair yellow-red, hunchbacked, dead. III. 10, red hair, blue eyes. III. 8, hair brown. II. 8, hair red. II. 7, dark. I. 1, went abroad, no information. II. 5, said to be dark. II. 6, called "red-haired" (Gaelic). III. 5, very red hair. III. 4, fair hair and fair skin. II. 1 and 2, nothing definite known, said to be Norwegian and fair. II. 1, went to Canada and had a family. III. 1, no information. V. 20, dark brown hair, iris blue, has illegitimate daughter, VI. 28, aged about 7 (1909), seen, iris blue, constant lateral nystagmus, pupils black, hair brown. V. 21, blue iris, fair hair. VI. 29, fair hair, blue eyes. VI. 30, brownish hair, squint. VI. 31, fair hair. V. 22, light blue steady eyes, fair hair and shortsighted, pupils said to have been red when young and very weak. VI. 32, brown hair and eyes. VI. 33, brown hair and blue eyes. V. 23, red hair, blue eyes. VI. 34, dark hair, brown eyes. VI. 35, reddish fair hair, blue eyes. V. 25, brown hair, grey-blue eyes. V. 28 and 29, red hair, blue eyes. V. 30, brownish fair hair, blue eyes. VI. 1 to 5, generally fair hair and blue eyes. VI. 6, abroad, but said to have dark hair and short sight. VI. 7 to 12, generally dark. VI. 13, cannot be traced. VI. 14 to 23, none albinos, all dark hair and eyes. VI. 24, fair hair. VI. 25 to 27, dark. VI. 36 to 39, brownish hair, grey blue eyes, all more or less shortsighted. VI. 40 to 45, all dark hair and grey blue eyes, three are shortsighted. VI. 46 and 47, brownish hair and eyes. V. 54, female albino, fair hair, eyes blue, nystagmus, shortsighted; her sister (V. 56), also albino, fair hair, nystagmus, shortsighted. V. 55 and 57, brownish hair. IV. 43, hair rather fair, grey eyes. III. 16, fair. III. 17, no particulars. II. 9 and 10, red haired. III. 18, dark hair. IV. 48, dark hair, very shortsighted, nystagmus. IV. 44, albino, fair hair and skin, shortsighted.

¹ The descent line should go to II. 18 and not to II. 17 in figure.

IV. 45 to 47, fair haired. III. 2, fair. III. 3 and IV. 3, abroad. III. 6, brown hair, has numerous descendants (IV. 11) cannot be traced. IV. 1 and 2, fair hair and skin. IV. 4, red hair, blue eyes, abroad; no information about V. 1. IV. 5, dark hair. V. 2 to 11, dark hair generally, greyish blue eyes, good vision. IV. 6, abroad. IV. 7, albino, fair and shortsighted. V. 12, fair yellowish hair, blue eyes, shortsighted, albino. V. 13, red hair. V. 14, red hair and shortsighted. V. 15, red hair. IV. 8 and 9, dark hair. V. 16 to 19, generally dark (nothing definite known). IV. 12 and 13, fair hair, abroad. IV. 14, abroad. V. 31, not traced. IV. 15, fair, shortsighted. V. 32, fair hair and bad sight. IV. 16, dark, eyes grey blue. V. 33, abroad. IV. 17, dark hair and eyes. V. 34, fair. V. 35, dark. IV. 18, brown hair. V. 36 and 37, hair brown. V. 38, fair and shortsighted. V. 39 and 40, fairish brown hair. IV. 19, brown hair, grey eyes. V. 41 and 42, brown hair, blue eyes. V. 43 and 44, dark hair and squint. V. 45 to 47, brownish hair. IV. 20, dark hair and eyes. IV. 21, dark hair. V. 48, brown hair, blue eyes. V. 49 and 50, dark hair and skin. V. 51, brownish hair. V. 52, fair, hair almost white, shortsighted. IV. 22, dark hair. IV. 23, fair hair. IV. 25 and 28, fair hair. IV. 26, 27, 29, 30 and 31, dark hair. V. 53, all dark hair and blue grey eyes. IV. 32 and 33, dark hair, blue eyes. IV. 34, brown hair, blue eyes. IV. 35 to 39, no information. IV. 40 to 42, dark hair generally. II. 3 and 4, said to be dark. III. 7, hair brown. III. 9, dark hair and eyes. III. 11, hair dark, grey eyes. III. 13, dark hair, blue eyes. III. 12, 14 and 15, hair fair or brown and blue eyes. Information has been supplied by V. 27. Family from Skye. (June, 1909. C. H. Usher.)

Fig. 597. A much interlinked pedigree from the village of Ain Toura on Mount Lebanon in Syria. The whole of the albinos in this pedigree are said to be descended from one man, the son of a woman who according to report during pregnancy had scoffed at an albino. Pedigrees 598, 600, 601, 602 and 603 are from the same village, but it has not been possible to link them up with Fig. 597. It would appear therefore that we have records of some 26 albinos from this village, so that the prevalency of albinism must be very noteworthy¹.

II. 2, aged 60, complete albino, married, but no offspring. III. 5, an albino, died aged 4. III. 7, aged 40, albino, married a normal dark-skinned woman and has seven normal dark-skinned children. The normal brother of III. 7, namely III. 8, married his first cousin, III. 21, a normally pigmented woman, and has had six children. IV. 20, 21, 22, 25, are normal; IV. 23, aged 23, not married, intelligent and a shoemaker by trade, skin not pure white, freckles on neck, body hair pure white, hair of head not pure white, hair of beard said to be getting darker by shaving, nystagmus, but not very marked; iris blue and pupils dark; has been suffering for the last few years from granular conjunctivitis and trichiasis: see Plate NN (131). IV. 24 is an albino sister, now dead, of this young man. III. 28 and 29 are two brothers, who, normally pigmented themselves, had an albino cousin, III. 30; these brothers married within the family, and both have had albino offspring. The first has had IV. 26, an albino, aged 38, and three or four normal offspring, IV. 27; this family is said to be all married, but it is not quite certain whether this includes the albino; the children have no traces of albinism. The second brother had, IV. 36 and 37, two albinotic sons, who died aged 4 and 2 years. A sister (III. 25) of the wife of III. 28 was fair, but not an albino, she married III. 32, a "fair" man (it must be remembered that the normal Syrian pigmentation is very dark), and they had five children, IV. 30—34. Of these, IV. 32 and 33, are normally dark, they have married kinswomen, but have all dark children; IV. 34, aged 52, is an intelligent man, an albino, pupils red, nystagmus, not well marked, left divergent strabismus, vision defective, skin appears darker than it used to be, freckled all over, hair not wholly free from colour; he married a normal woman, and has three normal children. His sister, IV. 31, aged 25, is an albino, she has been a cook for four years and is unmarried. V. 4, aged 13, is an albino grandson of a sister of IV. 34's mother; he has four normal brethren, V. 5. In generation IV., we have also IV. 2, an albino boy who died aged 4 months, IV. 3 his sister is a strong and intelligent girl, whose photograph with that of one of her four normal brothers, IV. 4—7, is given on Plate NN (129); it is difficult to determine whether she should not have been marked with a complete rather than a half circle. Her hair (specimen sent) lacks all pigment; her skin is pure white with a few freckles on the neck, nystagmus, but not very marked, no strabismus, the iris is blue, but *the pupils are black*². Her mother's half aunt was the albino, II. 2. Of other albinos in the pedigree, III. 14, died aged 60, unmarried. Her parents, II. 13 and 14, as well as their brothers and sisters, II. 12 and 15, and their children, III. 12 and 18, are all dark. Her sister, III. 15, has an albino daughter, aged 40, unmarried, and two normal sons, IV. 15 and 18, with normal grandchildren, V. 1. and 2. Her brother, III. 13, married a normal woman, III. 11, with normal parents and brothers and sisters, but descended from an albinotic stock, and had six offspring, of whom three sons were albinos. IV. 11, aged 24, married outside the family, no offspring as yet, is a complete albino. His albinotic brothers died, IV. 13 when aged 18, and IV. 14 when aged 4. (Dr A. J. Manasseh, June, 1909; with hair specimens and photographs of several of the albinos.)

¹ It is hoped that at a later date we may be able to give a more complete account of this remarkable group of Syrian albinos.

² Dr Manasseh thinks that complete albinism of hair and skin with only partial albinism of the eyes is not infrequent in some Syrian cases.

Fig. 598. II. 1, aged 48, is an albino, whose mother and father, I. 1 and 2, both have dark skins; the father's sister, I. 3, was an albino. II. 1, married out of his family and has five normal children. (Case from Ain Toura, Dr A. J. Manasseh, May, 1909.)

Fig. 599. III. 1 and 2, normally pigmented Syrians from different villages. III. 1, has no albinism in her family, or any other peculiarity that could be ascertained. III. 2 had normal parents, II. 2 and 3, but an albino grandfather, I. 3. I. 1 and I. 2 were kin. Of the seven offspring in the albinotic sibship, IV. 1, 5, 6 and 7, are normal. The albinos, IV. 2, 3 and 4, are typical complete cases. Skin pure white, with very few freckles; hair of head, body, eyebrows and lashes pure white; blue irides, with marked red reflex, no strabismus; eyes closed up when examining objects. The ages are: IV. 2, 14 years; IV. 3, 12 years; IV. 4, 4 years. These albinos are intelligent and "sweet-looking." Two cousins, sons of a sister of the father, are also albinos. (Dr A. J. Manasseh, May, 1909.)

Fig. 600. This is another Ain Toura case. I. 1 and I. 2 are kin, degree not stated. They have six children, of whom two, aged respectively 40 and 35, are albinos. II. 7 is unmarried. II. 6 is married in America and not much known as to offspring. I. 1 and 2 have both the usual dark Syrian skin, and so have the brothers and sisters of the albinos and their children (numbers not given). (Dr A. J. Manasseh, May, 1909.)

Fig. 601. A case from Ain Toura. An albino woman, II. 4, in a sibship of six, married a man from a different village; her parents, I. 1 and 2, were not related, they are said to have had brothers and sisters none of whom were albinotic. No statement as to offspring of II. 4. (Dr A. J. Manasseh, May, 1909.)

Fig. 602. A case from Ain Toura. Normal parents, related to each other, had two children, one of whom was an albino, II. 2, who died aged 40. (Dr A. J. Manasseh, May, 1909.)

Fig. 603. A case from Ain Toura. I. 1 and 2 unrelated, had a single albino child, II. 1. (Dr A. J. Manasseh, May, 1909.)

Fig. 604. II. 1, a young albino, aged 16, had an albino sister. His mother's brother, I. 3, was also an albino. (Dr A. J. Manasseh, May, 1909.)

Fig. 605. This is a remarkably interesting pedigree, and further inquiries are being made with regard to it. Both father, II. 2, and mother, II. 1, are albinos, but full details of their albinism have not yet been sent. The eldest child, III. 1, is a deaf-mute with red hair; the second, III. 2, was an albino, very clever, but died aged 27, being married but without offspring; the third, III. 4, is not of the normal dark Syrian type, he is fair, but not albinotic; the fourth, III. 5, was an albino, she was married, but died at 23, no statement as to offspring; the fifth, III. 7, is not an albino, but is deformed. Cousins of the father, II. 3, are not of the normal Syrian type, but very fair, and one red-haired. The pedigree as far as it goes is of extreme interest; we hope to get further details especially as to the degree of the albinism and the nature of the deformity of III. 7. The family comes from village of Buhamdoon on Mount Lebanon. (Dr A. J. Manasseh, June, 1909.)

Fig. 606. Two partial albinos, father and daughter, in a long pedigree. III. 4, man aged 40 (1909), seen, farm servant, came on account of the well-known disease of optic nerve known as tobacco amblyopia, which has nothing whatever to do with albinism or any other congenital imperfection; hair light yellow, brows and eyelashes exceedingly light, moustache yellow-red, much darker than hair of head; iris grey-blue, just like an albino's, both irides had same appearance, with exception of a single small distinctly yellow spot close to pupil on right iris only; both examined carefully in good daylight with magnifying-glass, in left iris stroma apparently pigmentless, each iris had brown pigment ring at pupil (epiblastic layers); no red reflex in pupil; on focussing light on sclerotic red is seen in pupil and through most of iris, with dilated pupil (homatropine) red in pupil is more obvious, but very feebly marked through iris; whole of fundus has good colour, not albinotic; there is no keratitis punctata or other signs of disease; refraction R. mixed astigmatism 3.5 D.; L. H. 2 D. vertical meridian, 3 D. horizontal meridian; V. of each with correction = $\frac{6}{4}$, "has never had very good sight"; symmetrical relative central scotoma for red; no nystagmus. Mother, II. 8, and father, II. 3, dark. I. 1, hair fair, light blue eyes. I. 2, hair and eyes, no information. I. 3 and 4, not fair. IV. 1, hair very fair, iris blue, skin blond. IV. 2, hair red, iris blue. IV. 3, girl, aged about 8 (1909), seen, hair red, lashes and brows lighter red, skin blond; iris blue-grey, like father's (III. 4), no pigment in stroma (pocket lens used); constant lateral nystagmus, rate 100, refraction estimated low H. astigmatism; fundus albinotic, only at macula choroidal vessels are not clearly visible, vision "defective." IV. 4 and 5, twins, died 6th day, were very fair, like IV. 3. IV. 6, fair yellowish hair, "weak sight," wears glasses, aged 7. II. 1, dark, his family (III. 1) all died young. II. 2, not albino, about his children (III. 2) no information. II. 4 and 5, not albinos. II. 6 and 7, hair brown, none of their children (III. 8 and 9), very fair. II. 9, fair, and offspring (III. 10), a large family, nearly all fair. II. 10 and her two families (III. 11 and 12),

brown hair. II. 11, hair brown, children (III. 13), two fair, one dark, one no information. II. 12, dark. II. 13 and 14, hair brown. III. 14, some fair, some dark. III. 15, hair brown. III. 3, died at 19 months, fair hair and blue eyes. III. 5, died at 15, hair nearly white, eyes blue-gray, skin blond, good vision. III. 6, hair red. III. 7, hair red, eyes blue. I. 5, 6 and 7, dark. I. 8, no information. II. 15 to 23, dark. II. 24 and 25, dark. II. 26 to 29, only known that some were fair, some had brown hair. III. 16—22, "all black," i.e. very dark hair, so were III. 23—25. III. 27—32, none fair, not very dark; III. 26, hair is rather light brown. III. 33, all died in infancy, two were dark. III. 34—36, none very fair, most dark. A few of III. 35—36 have small young families, no information as to colour of hair. IV. 7—9, no information. IV. 10, dark. IV. 11, dark. IV. 12—15, irides of all blue, hair light to medium brown, no nystagmus. IV. 16—18, generally dark. (C. H. Usher, May, 1909.)

Fig. 607. Two albinos in a sibship of four. I. 1, a gardener at W. (? in Schlesien), healthy, 40 years of age (1834); dark blue eyes and brown thick hair on head and chin. I. 2, aged 35, healthy and strongly built, blue eyes and long light brown hair. II. 1, aged 15, a girl, blond hair and eyebrows, wholly normal blue eyes, and II. 3, aged 5, with same hair and eyes, were quite healthy and strong (1834). II. 2, an albino girl, aged $7\frac{1}{2}$, and II. 4, an albino boy, aged $1\frac{2}{3}$, 1834. II. 4, well-built, but small and thin; forehead arched forward, back of head flatter than usual; fine skin "ganz blass" and dry; face, not ruddy as those of II. 1 and 3; almost white, thin and short hair on head, eyebrows and lashes very thin, short and white; eyelids either kept shut or half-opened; very photophobic in sun and candle-light, likes reflecting surfaces in dusk; pupils light red when light falls on them, otherwise brown-red as a cherry; iris same colour, except on edge of pupil, where it has gray border with rays outward of like colour; rotatory nystagmus. II. 2, examined by Meyer one or more times annually during six years; there had been gradual development of pigment; tall for age, well-built, but delicate; tender dry skin, white like an infant's, cheeks have only fine "ganz leicht durchscheinende Röthe"; muscles not firm and little tendency to form fat; fairly long but thin, white and dry hair on head; eyebrows, thicker, long, soft as silk and white; at birth and in first year of life, eyes like those of brother just described, photophobia just like his; continuous nystagmus; description of head-shape, pupils and iris verbatim (in 1827) as that of II. 4 in 1834. From year to year, iris lost its red colour more and more, the gray-blue border extended and rays of like colour grew longer and thicker, so that in 1834, the red only took up small spaces in the nature of islands; the blue-gray of the iris passed into gray and became 'matt'; the pupil was still uniform red, but was no longer "hellroth," but dark, almost cherry-brown; the photophobia had much diminished, but the girl could not stand bright sunlight or candle-light, and in particular bright red colour, without sharp pain in bulbus, and flow of tears; found pleasure however in reflecting objects; in moderate light, as in clouded sky or twilight, saw quite well; recognises all colours, only is in a slight degree myopic. No bodily or mental defect in either albino. Meyer considered that the case was certainly one in which the "leucotic abnormality" of the eye had lessened with the time, and cites Blumenbach and Rudolphi to the effect that no change had ever been observed in albinos. Whether the change was really due to a "Nacherzeugung des Pigments," or to a thickening of the iris with age, does not appear certain, however. There is no reference to any hair change. Meyer remarks that all four pregnancies were normal, and that he could find nothing to throw any light whatever on the origin of the albinos. There is no record of consanguinity. (Dr Meyer, Creutzburg in Schlesien, *Medecinische Zeitung h. v. Verein f. Heilkunde*, Berlin, 1834, Bd. III. S. 189.)

Fig. 608. An albino, I. 1, married a normal wife, I. 2, and had two albino children, II. 1 and 2. It is not stated whether there were any normal children, but we take the wording to mean there were not. No consanguinity recorded. Further enquiries have not so far led to further information. Formerly in Orkedalen, Norway. (Dr V. Magnus, Christiania.)

Fig. 609. An albinotic father and son in Banffshire; further data have arrived since the plate was engraved (October, 1908) and are embodied in Fig. 642.

Fig. 610. A complete albino in a sibship of six. III. 3, man aged 58 (1908), reported to be albino, particulars obtained by letter from himself, is storekeeper, robust, unmarried; hair quite white, and always was white; skin very white, never freckles; eyes dark blue and oscillate; vision defective; pupils often red; has "weak eyes"; no deformities. Mother (II. 4) and father (II. 3) dark, not cousins. I. 2, dark. III. 1, 2 and 4 to 6, dark, none have children. II. 1 and 2 and II. 5, dark. (C. H. Usher, May, 1909.)

Fig. 611. III. 1, Rizq Yusif, aged 21, a Copt; height 155 cm., chest 87 cm., hair everywhere white, fair freckled skin; no pigment in iris, which is pink, much photophobia, no external eye disease; not anaemic, rather deaf in both ears, otherwise no apparent disease. He has four brothers, III. 2, 5, 6 and 9, aged respectively 18, 12, 8 and 2, all normal, and one brother, III. 4, an albino aged 14; he has three normal sisters, III. 3, 7 and 8, aged respectively 16, 6 and 2; III. 8 and 9 presumably are twins. The

father, II. 2, aged 58, and the mother, II. 3, aged 47, are normal and not related to each other. The grandfather, I. 1, was an albino (? paternal grandfather) and I. 2 was a "near relation," grade not stated. It is not known whether I. 1 had other children, but it is said that III. 1, III. 4 and I. 1 were the only albinos in the family. Hair colour and eye colour of other members not recorded. (Capt. R. L. V. Foster, R.A.M.C., through C. H. Usher, 1909.)

Fig. 612. One complete albino, III. 10, in a sibship of five. III. 7, died aged 39, of typhoid fever in America, married, and had one child, IV. 1, with blue eyes and brown hair, like the father, III. 7. III. 8, living, aged 45, three normal children. III. 10, aged 41, albino, married, with two children. IV. 3, both with blue eyes and light brown hair. III. 12, died of pneumonia aged 30, blue eyes and brown hair, he married and left one normal child. III. 14, aged 31, blue eyes and light brown hair, remains unmarried. The father, II. 6, died aged 71, had blue eyes and light brown hair; he suffered two years from a nervous disease which destroyed his sight; the mother, II. 14, aged 75, is living, blue eyes and black hair. There is no consanguinity. The father's and mother's brothers and sisters are as indicated in the figure, neither they, nor their offspring, are albinotic. Of those dead, II. 2 and 4, died about 70, II. 7 at 65, and II. 9 about the same age, II. 13 at 75; the others are still alive. The four grandparents, I. 1 and 2 and I. 3 and 4, were not related and not albinotic. No other case of albinism, no case of mental defect, nor any hereditary disease known in the family. (Dr V. Magnus, Christiania.)

PLATE LII. Figs. 613—627 are from the Philippine Islands, and have been provided by Dr V. G. Heiser, Director of Health for the Philippine Islands¹. They form admittedly only a preliminary step to a full investigation, and the extent of the albinism has not been fully dealt with. These pedigrees are not used in our statistical reductions.

Fig. 613. We have marked the albinos here as incomplete, although IV. 3 is marked total by Dr Heiser. The maternal grandmother, II. 2, and the great-grandparents, I. 1 and 2, said to be albinos, also "some relatives" not specified. The skin of both IV. 3 and IV. 4 is "thin, delicate, pink and white." The hair of IV. 3 is blond "decoloured," and of IV. 4 coarse brownish blond, without lustre. The irides of both are light blue, the "radiation, golden," and the pupils dark. They are both said to have "normal eyes," to be not short-sighted and to have strabismus, IV. 3 marked double strabismus. Both have poor mentality and weak constitution and IV. 3 is lymphatic and effeminate with a feminine voice. It seems reasonable from this account to suppose that an ophthalmoscopic examination of the eyes would have shewn more complete albinism than is indicated by "normal eyes," and that these albinos would fall into line with other Pacific cases. (See Table, p. 70, Cases 3 and 4.)

Fig. 614. Albinism in four generations out of five. We have marked all these albinos as incomplete, no details being given except of IV. 2, who is said to have had father, great-grandparents and two children albinotic. IV. 2 is described as a "partial albino," his skin being coarse and white in certain regions, he is aged 65 and hair ashy black; he is weak and easily angered, of average intelligence. The eyes are said to be normal, the irides gold brown but the pupils are described as "light blue," which it is not easy to interpret. (See Table, p. 70, Case 5.)

Fig. 615. III. 1, aged 24, is said to have a "Malay" skin; he has a grandfather and sister albinos. The eyes are "normal," the irides being gold brown and pupil "blue" (!). The incomplete albinism appears to lie in the hair which is "corn auburn" and coarse. III. 1 is of poor intelligence, but strong, content and happy. (See Table, p. 70, Case 6.)

Fig. 616. III. 2, a female weaver, aged 35, described as a "partial albino" has a daughter, a sister and "all" her grandparents albinotic; she has seven normal children. Her skin is coarse and thin, sunburnt and "white in parts." Her hair is dark, slightly brown; her eyes described as "normal" have light blue irides but dark pupils; she is of fair intelligence, irascible, and of strong and healthy constitution. (See Table, p. 70, Case 7.)

Fig. 617. IV. 1, aged 24, is classed as a "partial albino," and is said to have seven brethren, a father, paternal grandparents and great-grandparents all albinotic. His eyes, with brown irides and black pupils, are described as normal; the skin is sunburnt, and the only mark of incomplete (not partial) albinism provided is "auburn brownish" hair. IV. 1 is sickly, weak and nervous, besides being of poor mentality. (See Table, p. 70, Case 9.)

Fig. 618. II. 1 and 2, aged 30 and 20, are described as total albinos; the skin is pink white, the hair cream white and the irides and pupils pink; there is no family history of albinism. Both brothers are intelligent, robust, good natured and good workers. (See Table, p. 70, Cases 15 and 16.)

Fig. 619. There appear to be three albino siblings in this family with an albino aunt. The parents I. 1 and I. 2 were not related but the mother is said to have been "very fond of white flowers during

¹ Report (in MS.) to Dr Fraser of Kuala Lumpur and C. H. Usher: see our Text, pp. 67—71.

pregnancy." Except the aunt (maternal or paternal?) no history of albinism known on either side. When all the family were alive, there were two boys, II. 1 and 2, three girls, II. 3—5, who were not albinotic, an albino boy, II. 6, now dead, and two living albino sisters, II. 7 and 8, aged 30 and 25 respectively. Their skin is said to be dark pink, their hair almost white—"extremely light straw colour." Their irides are described as dark with yellow radiation and the pupils as dark, but "both albinos are rendered uncomfortable by light." It is therefore very unlikely that the eyes are unaffected by the albinism; they probably belong to the type of dark race albino with only slightly modified vision. They are of good intelligence. Three of the five normal children are dead. (See Table, p. 70, Cases 19 and 20.)

Fig. 620. This is an interesting case as both father and mother appear to be partial albinos. I. 1, the father, has an unpigmented patch 1.5 cms. in extent just below the left outer malleolus. II. 2, the mother, has jet black hair, with the exception of some brown strands in left temporal region. She is fourth cousin to I. 1. By a normal first husband, I. 3, she had an albino child now dead. By her second husband she has one normal and three albino children all marked as "total" in Dr Heiser's report, and probably as complete as many albinos of dark skinned races. II. 1, 2 and 3, aged 11, 6 and 4 respectively, have fine blond skins, light brown hair, grayish brown irides and "dark" pupils. Yet they are said to be "uncomfortable in the light." They are described as "European children" in appearance. (See Table, p. 70, Cases 21—23.)

Fig. 621. An incomplete albinotic woman, III. 2, aged 35, delicate, frail and weak with a light skin and white semi-circle surrounding upper part of both corneae, has had five albinotic children, IV. 1—5. The mother's sister, father and grandfather are described as albinos. IV. 2 is said to be totally albinotic, aged 10, skin thin and white, hair fine and white, there is no account of eyes; the toe-nails are blackish. IV. 5, aged 5, has white pinkish skin, white and shiny hair, pink irides and pupils, suffers from photophobia, nystagmus and nyctalopia; she is a delicate child. There is no detailed account of the other albinos. (See Table, p. 70, Cases 27—29.)

Fig. 622. An interesting pedigree, as further illustrating how the mixture of the dark races may lead to blond variants. The Chinaman, III. 3, married a normally pigmented Philippine woman, III. 4, who came, however, of apparently albinotic stock. His two daughters were albinos. The first mestiza, IV. 2, aged 40 (Maura Toñgio) is described by Dr Heiser as a "total" albino. She has a "blushing" skin, blond hair, blue irides, and dark pupils; she is healthy and of good habits. Owing to the dark pupils, she has been marked as an incomplete albino, but without ophthalmoscopic examination it is not possible to state the nature of the albinism of the eyes. No further account than "albino sister dead" is given of the other mestiza, IV. 3. A cousin of IV. 2, a normal woman, IV. 4, has three albino offspring in a family of eight, all described as total. V. 6, aged 12, has pale and dead white skin, semi-auburn hair, and light blue irides. V. 7, aged 4, has pale and dead white skin, dark golden hair, light blue irides. V. 8, aged $\frac{7}{12}$, has also pale and dead white skin, gold "decolourated" hair and light blue irides. V. 6—8 are, however, all said to have dark pupils. We have therefore marked them as incomplete, although a thorough ophthalmoscopic examination would probably shew that they were as "total" as the majority of dark race albinos. Of Maura Toñgio's own children, V. 1—5, the first, V. 1, aged 22, is described as "partial" but no details are given about him, beyond the statement that he has black hair. V. 2, aged 16, has a "blushing" skin, brown ochre hair and light blue irides. V. 3, aged 10, has the same skin and irides with golden brown hair; the pupils of V. 2 and 3 are said to be dark. Both are classed by Dr Heiser as total albinos. The great-grandmother of their father (IV. 1) was an albino. (See Table, p. 70, Cases 30—36.)

Fig. 623. An Englishman, I. 1, married a Philippine native and his son, the mestizo, II. 1, has an albino grandson, IV. 1, classed by Dr Heiser as "total." IV. 1, has two normally pigmented offspring. IV. 1, aged 46, is stated to have a characteristic albinotic white skin, gold blond hair and light blue irides, but the pupils are again described as "dark." He is of good physique and habits. (See Table, p. 70, Case 37.)

Fig. 624. This is another case of an albino with a great-grandfather, who was an English mestizo. VI. 1, aged 38, has a "blushing" skin, pale blond hair, pink irides and red pupils, the "orbits are continually moving laterally," there is photophobia. V. 1, was born very small with imperforate anus. (See Table, p. 70, Case 39.)

Fig. 625. A sibship of four albinos, born of unrelated ancestry. II. 1, aged 8, has a white skin, golden hair and blue irides, good constitution but poor memory. II. 3, aged 5, has white skin, hair and irides, is of good constitution and intelligence. One albino brother is dead, and the surviving brothers are both myopic. The pupils of II. 1 and 3 are said to be "dark" and we have accordingly marked them as incomplete, but they are entered as total by Dr Heiser, and the same remark as we have made in previous cases applies. (See Table, p. 70, Cases 40 and 41.)

Fig. 626. Three siblings, two male and one female, I. 1—3, in a family where there is said to have been albinos for three generations. They are stated to have "sunburnt white" skins, blond hair, "brick red" irides, and "brick red radiation," but dark pupils; less than average intelligence. The classification upon these details is difficult. (See Table, p. 70, Cases 42—4.)

Fig. 627. I. 1 and I. 2, first cousins, had two offspring. Of II. 3, no information beyond the statement that he was an albino is given. II. 2, aged 52, has a normal daughter. She herself is returned as a total albino with sunburnt white skin, blue irides but dark pupils. There is no statement as to her hair; her constitution is weak and nervous, but mentality good. (See Table, p. 70, Case 45.)

On the plate containing Figs. 613—627, we have erred, if at all, in replacing Dr Heiser's "total" by "incomplete" albinism in the symbols. This is due to the repeated statement as to "dark" pupils; it is quite possible that a red reflex would have been observed with a more careful examination. Failing this, as the papers of Finsch and Seligmann show, Fijian and Papuan albinos will be frequently stated to have normal eyes or vision unaffected. There is probably no reason therefore to believe that Dr Heiser's Philippine cases are less complete than many returned as complete not only from the Pacific, but from the negro races of Africa.

Fig. 628. II. 2, W. L., a Russian, aged 9 months, second son of a prison warder, brought on account of the peculiar appearance of his eyes. Hair of head perfectly white. On the rest of the body nothing unusual in the pigment distribution was noticeable. Eyelashes white, conjunctiva and cornea normal. Iris light blue, its stroma well-marked. To focal illumination the pupils are bright red. Fundus typically albinotic. Horizontal nystagmus. V. and refraction not determinable. Family history negative. Parents have good eyes and are not related; the elder brother of the patient has also good eyes. (Dr. V. Odinzow, University Eye-Clinic, Moscow, Russia, July 31, 1909.)

Fig. 629. II. 4, P. B., a Russian, aged 24, married, seen May 1909. Hair of head, face and other parts quite white, face and neck florid. See Plate OO (132—3) for photograph. Eyelids and their borders normal, lashes long and quite white, ocular and palpebral conjunctiva somewhat congested. Well-marked bilateral horizontal nystagmus. Cornea and anterior chamber normal, pupils rather small and active to light. Iris quite lacking in pigment, its stroma as well as the margin of the lens particularly well seen by transmitted light. Lens and vitreous normal. Fundus characteristically albinotic, entirely devoid of choroidal pigment. On account of the nystagmus the corneal astigmatism cannot be measured. Total refraction by retinoscopy: R. H. 6 D. vertical, 8 D. horizontal; L. H. 3 D. vertical, 5 D. horizontal. V. of each eye uncorrected $\frac{9}{100}$, with correction only raised to $\frac{1}{100}$. Chronic catarrh R. middle ear. No other pathological conditions. Grandparents healthy. Parents, I. 1, father, aged 53, fair; mother, I. 2, aged 47, brunette; they have had eleven children of whom five are living; P. (the patient) is third born; the eleventh, a girl, was albinotic like P. but died in her fifth year; all the other siblings, living and dead, were free from any anomalies. P. has one son, normal. (Dr J. Smirnoff, Alexejeff Town Eye Hospital, Moscow, Russia, July, 1909.)

Fig. 630. Nyasaland. I. 1 and 2 said to be unrelated. I. 2 is normal and has had two normal children by the same father. They dwell at Kayuni's village, lake shore of North Nyasa. II. 1 is a girl, aged 3½. Hair curly, flaxen colour. Whole body covered with fine downy flaxen hair; no freckles; well developed. Has "pretty, blue" eyes; horizontal nystagmus; avoids sunlight on account of sun-burning and discomfort in eyes. Photograph Plate OO (136). (Dr G. R. Davey, Medical Officer, Nyassaland Administration. Letter to K. Pearson, July, 1909.)

Fig. 631. Nyassaland. III. 1 is an albino boy of about 8 years of age; hair curly and flaxen; body freckled and much sunburnt; "grayish yellow pupils" (? irides); horizontal nystagmus, avoids sunlight as far as possible; rather poor physique, intelligent for a native and goes to mission school. II. 1 and 2 were both of Ahenga tribe, but not related; they resided at Chikulamayimbi's village, Akamanga country in North Nyasa district. II. 2 married her deceased husband's brother and has a normal child by him (seen); there were no other children than the albino by the first husband. Mother and husbands normal; no information as to the husbands' parents, I. 1 and 2. (Dr G. R. Davey, Medical Officer, Nyassaland Administration. Letter to K. Pearson, July, 1909.)

Fig. 632. A remarkably interesting pedigree, showing inherited piebaldism for three generations. I. 1, the mother, and her two sons, II. 2 and 3, are represented on our Plate H (21). They belong to the village of Chitimba. The elder son has now a family and all his children have white marks. II. 3, seen by our informant, has woolly black hair of the ordinary negro type, except from crown to front, where there is a strip or "comb" two inches broad of yellow white. The eyebrows are normal, the eyelashes yellow white. The iris very light brown, which is common enough. There is no nystagmus and vision is good. The patches are congenital, and it is said have not altered their contour, but increased with growth. The white marking is down the median plane, missing the face and beginning again on the chest (see

photograph) shewing irregular patches and extending to the tip of the penis, to judge by the boy's description with the motion of his hand. Attempts are being made to get fuller particulars and additional photographs. (Information from Dr Emslie and a Scottish missionary, through Dr W. C. Souter, February, 1909.)

Fig. 633. Japanese. II. 3, a male albino, aged 16 (1905). Parents, I. 1 and 2, healthy and somewhat related, grandparents being blood relations ("Blutverwandtschaft der Grosseltern auch beide Eltern sind etwas verwandt"). II. 3 is the third son of nine siblings, no family history of albinism discoverable. All the siblings have more or less defective speech and have a slight degree of idiocy. II. 3's skin and hair white from birth, now quite white, marked photophobia and defective sight, slight nystagmus, iris white and translucent; fundus typically albinotic; lens and vitreous normal; vision in daytime, counts fingers at five feet, in evening in feeble lamp light at eight feet. Development average, cranium "sattelkopf." (O. R. Komoto, *Klinische Monatsblätter für Augenheilkunde*, Bd. xxvi. S. 534, 1907.)

Fig. 634. Three albinotic siblings in a sibship of six. Father and mother, I. 1 and 2, normal. II. 2, aged 60 years, albino, married, one daughter, III. 1, not albinotic, dead. II. 3, normal, dark hair, married, and has three normal children. III. 5, female albino, married, and has one normal daughter with dark hair. III. 7, female, "born insane." III. 8, male, dark hair. III. 9, female albino, dead. Locality, Fuseherred in Midthordland. (Dr V. Magnus, Christiania, October 2, 1909.)

PLATE LIII. Fig. 635. Four albinos in two related sibships from Bergen in Norway. IV. 5, aged 19, light brown hair and light blue eyes, just married. IV. 6, died of bronchitis at $2\frac{1}{2}$ years, ash blond hair and dark blue eyes. IV. 7, aged 17, black hair, dark blue eyes, convulsions to seven months old. IV. 8, aged 15, light brown hair and light blue eyes. IV. 9, female albino, aged 13, was a dwarf till five years of age, when thyroid treatment was adopted and she has now grown a little in stature, hair yellow, near the scalp white, light blue, grayish irides, red pupils, nystagmus, defective memory. IV. 10, male albino, aged 11, snow white hair, red pupils, white blue iris, nystagmus. IV. 11, male albino, aged 10, snow white hair, white blue iris with red reflex, nystagmus, more photophobic than IV. 9 and 10. IV. 12, aged 8, dark brown hair, blue iris with some yellow brownish pigment. IV. 13, aged 6, dark brown hair, blue eyes with some yellow pigment in iris. IV. 14, aged 4, light brown hair, blue eyes. The father, III. 41, aged 55, wholly unrelated to mother, has black hair, blue eyes with some brown pigment, and dark skin. The mother, III. 12, aged 44, has light brown hair, blue eyes, *her skin never tans in the summer*; she may thus be an incomplete albino in the lesser degree. Mother's brothers and sisters: III. 4, aged 54, brown hair, light blue eyes, married, with six normal children. III. 5, aged 52, red brown hair, blue eyes, single. III. 7, aged 49, red brown hair, blue eyes, married, with three normal children. III. 9, aged 48, light brown hair, blue eyes, married, four normal children. III. 10, miscarriage. III. 11, died aged nine weeks, cramp, pigmented. III. 13, miscarriage. III. 14, aged 43, brown hair, blue eyes, newly married. III. 16, died aged two of measles, brown hair and blue eyes. III. 17, aged 34, black hair, brown eyes, married, three normal children. The father, III. 41, had no brothers or sisters. His father, II. 23, was drowned, he had black hair; his mother, II. 24, died aged 79, she had black hair and was unrelated to II. 23. The maternal grandfather, II. 5, aged 80, apoplectic, blond hair, blue eyes, *skin did not tan in summer*, married a wholly unrelated woman, II. 4; she, aged 81, had black hair, dark brown eyes, and *her skin did not tan in summer*. Maternal grandmother, II. 4's, brothers and sisters: II. 2, died at 83 of old age, black hair, blue eyes, married twice; by first wife, II. 1, he had six normal children; by second wife, II. 3, he had another family, exact number unknown but all pigmented. II. 8, aged 79, black hair, married three times; by second and third wives he had no children; by first wife he had eight children, all normal, these are stated to be all married and to have no albino offspring. II. 11, died aged 60, black hair, married twice; by his first wife, II. 10, a mulatto, he had one normal son; by his second wife, II. 12, three normal sons in the United States. II. 14, married twice, with four normal children by the first and six by the second husband. II. 16, light hair, blue eyes, *her skin does not tan*, but becomes red in summer; married, with eight children as follow. III. 25, aged 40, light brown hair, blue eyes, married, with three normal daughters, IV. 16. III. 26, dark brown hair, blue eyes, married, no consanguinity, with two children, IV. 17, a daughter, dark, and IV. 18, an albino and an idiot. III. 28, III. 30, III. 32, all normal, have two, three and one offspring respectively. III. 34, died, single, of pulmonary tuberculosis. III. 35 and 36, twins. Returning to generation II., II. 18 is married and has had three daughters. III. 37, married, with normal children. III. 38, blind after an infantile disease. III. 39, died young. Finally, II. 20, married twice and has had five normal children. There are no other cases of albinism known in the family. (Dr V. Magnus, Christiania, Norway.)

Fig. 636. Two albinos in the same sibship of four members. Male, IV. 3, aged 13 (1909), seen, markedly albinotic, hair silky white, skin blond, iris light blue, constant lateral nystagmus, pupils black, refraction R. H. $\cdot 5$ D. in oblique meridian, My. $2\cdot 5$ D. in opposite meridian, V. corrected $= \frac{6}{36}$; L. H. $\cdot 5$ D. in oblique meridian, My. $3\cdot 5$ D. in opposite meridian, V. corrected $= \frac{6}{36}$; fundus, optic discs appear darker than surrounding fundus and are not too well defined in outline. IV. 4, female, aged 6 (1909), seen, with well-marked albinism, hair like brother's, IV. 3, but not quite so white, skin blond, iris light blue,

constant lateral nystagmus, pupil black, refraction R. H. 2.5 D. in vertical meridian, 7 D. in horizontal meridian, V. with correction = $\frac{6}{80}$, L. H. 1 D. in vertical meridian, 7 D. in horizontal meridian, V. with correction = $\frac{6}{80}$, corneal opacity in R. Mother, III. 5, hair jet black, brows dark brown, iris light yellowish brown. Father, III. 3, hair dark brown, iris brown, died, aged 42, of phthisis. II. 8, hair black, eyes brown. II. 6, red hair, was called "red Jamie." I. 1 and 2 were dark. II. 1 and 2, no information except the latter was gray in old age. III. 1 and 2, all dark haired, nothing known of their families. II. 3 and II. 4, hair black. III. 4, have red hair. II. 5, red hair. II. 7, no particulars as to them or their families. III. 6 and 7, hair dark. IV. 5, no particulars. IV. 1, aged 18, hair dark, formerly golden; iris blue gray. IV. 2, hair reddish, eyes blue. The history was obtained from III. 5. (Mr Thos. Snowball's Case, Oct. 20, 1909.)

Fig. 637. Two albinos in a sibship of ten from Skjeberg in Norway. IV. 3, died as child, no record of hair or eye colour. IV. 4, aged 48, albino, married, no children. IV. 5, died aged 39, dark hair and beard, married, four normal children. IV. 7, aged 45, dark hair, married, many children, none albinotic. IV. 9, aged 44, dark hair, married, no information as to children. IV. 11, aged 43, dark hair, single. IV. 12, aged 41, dark hair, single. IV. 13, aged 40, albino, married, and with three children: V. 4, aged 17; V. 5, aged 15; V. 6, aged 12, all blond but not albinotic. IV. 13, has been under observation in a lunatic asylum on account of vagrancy and theft. IV. 15, aged 38, dark hair, married, some children, none albinotic. IV. 17, aged 35, dark hair. The father, III. 3, aged 70 (?), has dark hair, the mother, III. 4, died aged 54 years, dark hair, no consanguinity. The father had a single sister; III. 2, who is married with two normal children; the paternal grandparents were not albinos, but their hair and eye colours are not recorded. II. 1 was a Dane and died of apoplexia cerebri. The pigmentation of the maternal grandparents is unrecorded, but they were not albinotic, and II. 4 died aged 95. The mother's maternal grandmother, I. 2, was insane; also either III. 5 or 7, one of the mother's brothers is insane; further one of the albino's brothers, IV. 5, 9, 15 or 17, was confined during one winter in a lunatic asylum, there is thus no doubt as to the presence of insanity in the maternal stock. Of the mother's siblings, III. 5, dark hair, is married in United States. III. 7, red hair and beard, married, some children, not albinotic. III. 9, dead, married, with three normal sons. III. 11, married, and has normal children. III. 13 and 14, two single dark haired normal sisters. No further cases of albinism known in the family. (Dr V. Magnus, Christiania, Norway.)

Fig. 638. A case of some interest, the partial albinism, consisting of a white lock, appears to be inherited only through the female, and to occur only in the males. II. 3 (reported by IV. 7), IV. 7 and VI. 1 had patches of white hair on the back of the head. The patch on VI. 1 is about the size of a shilling, it is slightly to the right of the median plane and above the occiput; the skin from which it springs does not appear less pigmented or otherwise differentiated from the adjacent skin. Offspring of V. 3 are known to exist and are said not to be affected, but details could not be ascertained. (K. Pearson, Sept., 1909.)

Fig. 639. One incomplete albino. V. 27, female child, aged 5 (1909), seen; hair light yellow, brows nearly white, lashes rather darker; skin blond, burns with sun, does not freckle; iris blue gray; adherent leucoma of left eye; media of right eye clear; pupil black, often noticed red by relatives, and it is red after mydriatic; nystagmus constant lateral, 124 per minute; refraction R. My. 5 D. horizontal, 7 D. vertical, V. corrected, names small objects; lateral movements of head when fixing small objects; fundus not very pale, most red at macula. Photograph Plate OO (134). V. 24, died nine months, blue eyes, very fair hair, no nystagmus. V. 25, iris blue, hair light brown. V. 26, iris blue gray, hair light brown. Mother (IV. 24) dead, burnt, was alcoholic, hair brown, had another child, V. 21, dark, by IV. 23. Father (IV. 30) illegitimate, iris blue, hair dark brown, moustache reddish. III. 6, 7, 8, 10, 12, all with blue iris and yellow red hair. III. 20, 22, 23, 25, 26, all dark. III. 32, hair red, reddish whiskers, iris blue. III. 31, hair brown, in asylum 15 years. III. 29 and 30, eyes and hair brown. III. 28, light hair, blue eyes. III. 38, hair brown, eyes blue, died 57, had a child, IV. 38, dark, by III. 39. III. 33, 35, 37, 40, 41, 43, had brown hair. II. 11, hair yellow red, blue eyes. II. 10, light blue eyes, hair dark red brown (seen in locket). II. 12, dark, second wife of II. 11. II. 14, dark. II. 13, had "ordinary complexion." II. 15 and 16, getting gray when remembered, not albinotic. II. 17, same as last two. II. 18, not albinotic. II. 19, brown hair. I. 1, died 102, vision good. II. 1, 3, 5, 7, 8, dark. III. 1 to 3, families, no information. III. 4, dark, had large family, IV. 1, none very fair. III. 14, 16, 18, 19, all dark. IV. 2, 3, 5, 6, 7, all blue eyes, hair sandy red. IV. 8 to 11, families, numbers and particulars not known. IV. 13, dark, his children (V. 2 to 6) brown hair, one dark. IV. 15, fair, died 14. IV. 16, iris blue, hair dark red brown. IV. 18, died young, no information. IV. 19, 21, 25, fair. IV. 27, at least six, all dark. IV. 28, no information. IV. 29, six, all dark. IV. 31, 33, hair brown. IV. 34, fair. IV. 35, none albinotic. IV. 36, dark. IV. 37, eight or nine, none albinos. IV. 40, 41, 43, 44, 46, 48, 49, brown hair. V. 1, four or five. V. 7, 9, 11, 12, 13, 14, 15, 16, children of IV. 16. V. 7, illegitimate, hair brown. V. 9, illegitimate, hair brown, iris blue. V. 11 and 12, twins, illegitimate, died five weeks, not fair, these all had different fathers. V. 12, died 7½ months, fair. V. 14 and 15, still-born. V. 16, has hereditary syphilis. The

father of V. 13 to 16 has brown hair. V. 17 to 20, brown hair. V. 22 and 23, all fair, none albinotic. V. 28, 29 and 32 to 34, dark. V. 30 and 31, fair. V. 35 and 36, no information. VI. 1, brown hair. VI. 2, not albino. VI. 3, iris blue, hair light brown. (C. H. Usher, June, 1909.)

PLATE LIV. Fig. 640. In 1849 and 1850 the Chassot-Rey families were investigated by Cornaz, and in 1907—8 K. Pearson got in touch with living members of this family; it would have been exceedingly difficult, however, to work out the very complex pedigree by letter, and accordingly C. H. Usher made a visit to Switzerland in September, 1909, and brought this classical pedigree down to date. If the pedigree be considered disappointing owing to the fact that no further albinos have occurred, it is still of remarkable scientific interest to see a record of four further generations of normal members. Further a good many additions and some corrections have been made to the original part of this pedigree as given by Cornaz and reproduced in our Fig. 313. To assist the reader the following relations of Figs. 313 and 640 are given¹:

Fig. 313	Fig. 640	Fig. 313	Fig. 640	Fig. 313	Fig. 640
I. 1—4 =	I. 1—4	II. 2	= II. 1	II. 5 =	II. 7
II. 8 =	II. 10	II. 12 and 13 =	II. 13 and 14	III. 3 =	III. 5
III. 5 =	III. 11	III. 14	= III. 21	III. 6 =	III. 12
III. 13 =	III. 20	IV. 1	= IV. 6	IV. 6 =	IV. 18
IV. 8 =	IV. 20	IV. 9	= IV. 21	V. 4 =	V. 56
V. 6 =	V. 58	V. 7	= V. 59	V. 13 =	V. 65

A comparison of these identities will show that we have not been able to agree with Cornaz at all points. V. 65 is the living albino (1909), linking our pedigree with Cornaz's.

Through the kind co-operation of Mlle Ernestine Volmar of Estavayer, who is known to the people of the district and who understands their dialect, a considerable number of descendants have been traced. There was difficulty in linking certain present-day groups to their proper ancestors because the registers do not extend sufficiently far back, or they contain insufficient information, the 1850 account is not full enough and there is a confusing custom of calling individuals by names other than their own, thus Jean is often called Jean François; Baptiste often Jean; François often Baptiste; Joseph often François; Jean-Jacques and Pierre often Jacques.

It is from the statement of V. 75 that III. 18, Jean, is given as a brother of Marguerite Rey (III. 17). In the register a Marguerite and a Jean are recorded as siblings of a Jacques Rey (II. 11). The fair family, VII. 40 to 46, were traced to II. 5 (Pierre Joseph Chassot) not mentioned in the 1850 account. According to "La généalogie des Chassot," by Daguet, Jean Chassot, born 1719, had not only two sons called Jean (illegitimate) and Jean Baptiste (born 1747), but also Pierre Joseph and Richard. Jean Baptiste had a daughter Françoise. Now, the Jean Baptiste of the 1850 account had a daughter who went to Dompiere and from the register there her name has been found to be Françoise. The wife (III. 6) of Jean Pierre Chassot (III. 5) called Planceval by Cornaz should be Plancherel.

At the present time there are Chassots and Reys at these villages who are said to be not related to the families of this pedigree and there are other groups of people supposed to be related who could not be linked on to any one in the pedigree. No albinos occur among them. Although our data do not show it, intermarriage is said to be frequent. Possibly if the Chaney and Plancherels had been more thoroughly followed up this would have been evident². Deformity and disease are common amongst the inhabitants. In the pedigree VI. 101 is half-witted; VI. 95, poorly developed; V. 37, rather deaf and stupid; VII. 53, half-witted and slavers; V. 10, has delusions. A number of others are stunted and feeble. It was reported that IV. 9 had two silly sisters with deformed limbs. V. 9 has a sister with bone disease (caries).

Particulars of hair and eye colour are recorded below. Some 60 persons were seen by C. H. Usher, and others by Mlle Volmar. There is no evidence to show that there have been any albinos amongst the

¹ The names given in the 1850 account correspond thus: I. 1, Jean Chassot; I. 3, — Rey; II. 1, Jean Chassot; II. 3, Jean Baptiste Chassot; II. 7, Françoise Chassot; II. 10, Jacques Laurent Rey; III. 5, Jean Pierre Chassot; III. 11, Jacques Rey; III. 12, Charles Rey; III. 13, and 14, Laurent and Jean Rey; III. 17, Marguerite Rey; III. 20, Susanne Chaney; III. 21, Françoise Chauey; III. 7, Daughter who married in Dompiere; IV. 6, Josephine Chassot; IV. 7, and 8 Henriette and Nanette Chassot; IV. 17, Laurent Chassot; IV. 18—21, Marguerite, Jacques, Jean, Louis, Marie Rey; IV. 22, Nicolas Rey; IV. 30, Jean, dit Jeannet Rey; V. 55—66, Marie, Françoise, Joseph, Marguerite, Madelaine, Nanette, Celestine, Josephine, Jacques, Ursule, Thérèse, Pierre Rey.

² Between 1702 and 1846 there were 12 marriages of Chassot with Plancherel. Population (1909) of Bussy 280, of Montet 397.

Chassots and Reys since the account of 1850. A nun (VII. 97) supposed to be an albino was seen, she was fair although not albinotic. The child (VII. 77) near Romont, although fair is not albinotic.

For kind assistance our hearty thanks are due to Mlle Volmar, the Curés of Bussy, Montet and Dompierre and to several individuals in the pedigree.

The original Cornaz pedigree involved four complete albinos in one sibship, three complete albinos in one sibship of the previous generation, and one complete albino in another sibship. V. 65 (Thérèse Rey), the only one alive of the eight albinos mentioned in the account of 1850; aged 74 (1909), seen; bedridden for three years with "paralysis of legs," is alert and intelligent; no congenital deformities of hands or feet; can move legs; on flexor and extensor aspects of forearms are a number of firm, well defined swellings, not adherent to skin; she is well nourished; hair yellow, on crown it is white, lashes and brows white; skin blond, no freckles; iris gray blue with red showing through in certain lights; constant lateral nystagmus; pupils red; photophobia; vision: never saw well, no worse now than formerly; hearing excellent (photograph and hair sample). V. 66, only one in sibship who married. His wife (V. 67), hair brown, iris green blue with brown spots. VI. 124, dead, hair and eyes brown. VI. 125 and 127, hair dark chestnut; iris brown. VI. 129, red hair, eyes brown. VI. 130, hair yellow red, iris yellow brown. VII. 96, hair brown, iris blue with brown at pupil. VII. 97, hair blond, iris blue gray, yellow at pupil. VII. 98, hair and iris brown. VII. 99, hair "fair like colour of corn," brows light brown, iris blue, pupils black; no nystagmus; skin blond. VII. 100, hair brown, iris blue. IV. 31 to 39, none albinos. V. 68 and 69, all dark. V. 70, fair. V. 71, dark. VI. 133 (first ♂), blond. VI. 132, 134 (second and third ♂'s), hair brown. V. 72 and 73, hair brown. V. 74, hair red brown, eyes blue. V. 75, hair gray, formerly brown; aged 79; iris blue. VI. 135, hair brown, iris blue. VI. 137, all blue eyes, hair brown or chestnut. VI. 138 and 139, hair light brown, eyes blue. VI. 141, dead, not albino. VI. 142, died young; hair brown. VII. 101, hair brown, iris blue. VII. 102, hair blond, iris brown. VII. 103, hair red brown, iris gray. VII. 104 and 105, all brown hair, blue eyes. III. 7, no albinos known in her descendants. VII. 29 and 31, dark. VII. 32, hair brown. VII. 33, very fair, eyes blue, but not albino. VII. 35, hair brown, gray eyes. VII. 36, hair light brown, eyes blue. VIII. 3, hair light brown, eyes blue. VI. 41—3, 46, 48, 50, 52, 53, none albinos. VII. 40 to 46, all blue eyes and two (VII. 42 and 45) hair very fair, have been traced to II. 5 on father's (VI. 54) side. Mother of maternal grandfather of VI. 55 was a Plancherel. IV. 6, albino, quite blind for three years before death; died in fit, aged 77, single. V. 7, hair chestnut with a few white hairs here and there said to have been present at birth, iris blue. V. 8, hair dark brown, iris green blue with yellow spots. V. 9, hair black, iris brown. V. 10, hair and iris brown; has delusions; married, no offspring. V. 12, died young, no information. V. 13, hair and eyes brown. VI. 28 (not seen), hair chestnut with a few white scattered hairs present from birth as in mother (V. 7), vision defective, no nystagmus, hair formerly fair, pupils black, seen red like white rabbit's occasionally by father (V. 6). VI. 29 to 40, all blue or green blue iris (except VI. 34, eyes brown), hair brown or light brown. VI. 37, married, no children. IV. 1 to 5, children of III. 1, none albinos. V. 1, iris and hair brown (hair now gray). VI. 1 and 2, iris green blue with brown on pupillary part, hair brown. VI. 4, iris blue with brown spots, hair dark brown. VI. 6, dead. VI. 7, hair brown, iris blue with yellow spots. VI. 9 to 12, in Paris, no particulars. VI. 13, iris blue with yellow, hair brown. VI. 15, iris green blue with broad brown area at pupil, hair dark brown. VI. 17, 18, 20, 22, 23, 25—27, iris and hair brown, all dark. VII. 1, 2, 7, 8, 9, 11 to 14, 19, 20, iris blue green with brown pupillary zone, hair brown or chestnut. VII. 3 and 10 iris blue with yellow spots, hair brown. VII. 4, 5, 6, 15 to 18, 21 and 26, iris brown, hair generally light brown. VII. 22, 23, 24, all dead, dark. IV. 17, no albinos amongst descendants. V. 19, hair chestnut, eyes blue. V. 20, 21, 23, brown hair. V. 24 and 25, dark. V. 26 and 27, hair reddish. V. 28, hair brown, eyes gray blue. VI. 56, iris blue, hair dark brown. VI. 58 and 59, hair brown. VI. 61, hair blond. VI. 63, 65—69, none albinotic. VI. 70, hair reddish, iris brown. VI. 73, hair reddish. VI. 72 and 75, hair dark. VI. 76, hair blond. VI. 78, iris blue; hair dark brown. VI. 77, 80, 81, 83, 85, hair chestnut. VII. 47, hair black, eyes blue. VII. 48 and 49 hair blond, eyes blue. VII. 50, hair dark brown, eyes green blue with yellow at pupil. VII. 51, hair chestnut, iris gray blue. VII. 52, iris brown. VII. 53, hair brown, iris blue with yellow spots, is half-witted and slaverer. VII. 54 to 58, none albinos. VII. 59 to 61, hair reddish, eyes brown. VII. 62 to 65, hair blond, iris blue with brown. VII. 66 and 67, hair blond. VII. 68 to 70, generally dark. VIII. 6 to 8 and 15 to 17, hair brown. VIII. 20, iris and hair brown. IV. 22, no albino descendants. V. 30 and 31, hair brown, eyes gray blue. V. 32 to 35, hair brown. V. 36, hair blond, iris gray blue. V. 37, hair brown, iris blue; rather deaf and stupid. V. 29 and 38, brother and sister. VI. 86 and 87, hair brown, eyes blue. VI. 89, 90, 91, hair brown. VI. 92 and 93, hair chestnut, eyes gray blue. VI. 94, 96, 97, all died young; some blue eyes. VI. 95, hair and iris brown, poorly developed; he and his mother (V. 37) are only survivors (1909) of descendants of IV. 22. V. 39, dark, died unmarried. V. 40, hair dark brown, iris green blue, no children. V. 41, dark, dead, no offspring. V. 48, iris blue green, hair blond. V. 50 is first wife of V. 51. V. 51, hair brown, eyes blue; married three times, has children by first two wives (V. 50 and V. 52). V. 53, hair brown. V. 54, hair chestnut, eyes gray blue. The albino V. 56 died 1890, aged 74. The albino V. 58 died of cancer, aged between 60 and 70. The

albino V. 59, died 1906, aged 84, was bedridden, as Thérèse (V. 65), for 20 years. VI. 98, 99, 100, hair brown. VI. 101, half-witted; hair auburn, iris green blue with brown. VI. 102, hair dark, iris green blue; has goitre. VI. 104, dead, hair blond, eyes blue. VI. 105, four still-born or died very young. VII. 71, 72, 73, hair black or red. VII. 74, hair blond, iris blue. VII. 75, hair blond, eyes dark. VII. 76, hair blond. VII. 77, hair yellow, iris yellow brown, no nystagmus, skin blond, pupil black. VII. 78 and 79, died $7\frac{1}{2}$ months and 15 days respectively, very fair, but not albinos. VI. 106, hair dark brown, eyes blue green with yellow spots. VI. 107, hair dark. VI. 108, 112 and 123, hair and eyes brown. VI. 110, 114, 115, 119, hair blond, eyes blue. VI. 117 and 122, hair brown, eyes blue. VII. 80, 81, hair brown, iris blue. VII. 82, 83, hair and iris brown. VII. 84, 85, hair blond, iris blue. VII. 86, iris blue with yellow, hair brown or chestnut. VII. 87, hair and eyes brown. VII. 88 and 89, hair very fair, eyes blue. VII. 90 to 92, generally fair hair and blue eyes. VII. 93, fair hair, hazel eyes. (C. H. Usher, September, 1909.)

Fig. 641. An ancient Swiss family X. with a very fine pedigree. I. 1, born in 1723, died in 1806, is traceable back through nine generations in the male line to 1452. His ancestors held public offices of trust and importance; there is no evidence of any albinism. I. 1 had three children, II. 1, II. 2 and II. 3, who married respectively II. 12, II. 4 and II. 11, all children of I. 3 and 4. This triple marriage is the first recorded inter-relationship of the family X. with the family Y. I. 3 of the family Y. can be traced back in the male line through six generations to 1590, the ancestors being men of some position; there is no record of albinism in these earlier generations. The ancient members of the family X. have said that as far as their knowledge extends there were no albinos in that family before IV. 20 and 23. M. de Y. who died thirty years ago at the age of 81 asserted the same of the family Y. Nothing can therefore be gained by including earlier portions of these pedigrees. Of generation II. we know that T. X., II. 3, was born in 1761 and died in 1837; his wife, II. 11, M. V. de Y., was born in 1769 and died in 1820. Of the offspring of II. 3 and 11, III. 18, J. A. N. de X., born 1793, died 1887, married his first cousin, III. 17, V. de Y., born 1796, died 1874, who was also the offspring of first cousins, II. 5 and 6. III. 18, died very old; both his wife, III. 17, and he had blue eyes and very blond hair. The family has always attributed the physical defects which have appeared to this marriage. We have examined a photograph of III. 17 and 18 taken late in life. III. 18 had light brown hair until 70, he was myopic and always wore glasses. III. 17 was an extreme blond ("plus blonde qu'il ne convient"), examined under a lens the eyes in the photograph are seen screwed up as if photophobic. It seems probable that both III. 17 and 18 had defective sight and the former was probably a semi-albino. They had eight children, of whom we have the following details. IV. 12, born 1817, died 1892, had her skin covered with scabs. IV. 13, born 1819, died of alcoholism 1867. IV. 15, born 1822, was also an extreme blond ("plus blonde qu'il ne convient"), and suffered partially from nystagmus ("clignotait un peu les yeux"); her sight was feeble and she had some risk of being like her brother and sister ("il ne s'en fallait pas de beaucoup"); she is great-grandmother of an albino, VII. 4. IV. 16, her husband, had blue eyes. IV. 17, born 1825, died 1909, blue eyes, he stammered, he had no children. IV. 19, born 1828, died in infancy, 1833. IV. 20, born 1830¹, and aged 79 when seen, albino; hair, eyebrows and lashes white, skin blond, iris pale green blue, coloboma at upper part made during extraction of cataract in 1894; pupil red, L. cornea opaque after cataract extraction; feebly marked lateral nystagmus; "always shortsighted," photophobia; active, a very talkative and a "very learned man" who has published works of value; decidedly eccentric; single². IV. 21, a blue eyed blond, born 1834; she is grandmother of an albino, VI. 22. IV. 23, born 1840, aged 69, seen; hair and eyelashes white, brows yellow (possibly artificial), skin very blond; iris blue with yellow near pupil; pupil red; constant lateral nystagmus of a marked kind; "always shortsighted," photophobia. The first X.-Y. marriage, i.e. that of II. 1 and II. 11 had one child, III. 1, born 1788, died 1834, who had three offspring, IV. 1, 2, 3. IV. 1, born 1821, died single 1848. IV. 2, born 1824, died 1904, blue eyes and brown hair, married IV. 32, blue eyes, fine blond, born 1836, died 1904; they were double second cousins, their parents being double first cousins, no albinism has appeared in their descendants. IV. 3, born in 1826, died single in 1908; she had blue eyes and brown hair. The second X.-Y. marriage, i.e. that of II. 2 and II. 4 led to five children and four grandchildren. III. 3, married a kinswoman Y., III. 4, and had only a single child; the rest of their children had no offspring; this branch seems to have died out. Of the first cousin marriage in the Y.'s, II. 5 with II. 6, there were five offspring, III. 12, 13, 15, 16 and 17, of which we have considered III. 17. III. 12, married like his sister, III. 17, a Y. first cousin, III. 19, there were three offspring, IV. 9—11, all with blue eyes, their skins are said to have been covered with pimples owing to "impure blood"; all died single. II. 7, in the Y. stock, born 1759, does not seem to have married a kinswoman; the offspring were III. 21, born 1797, and dying 1874 without issue; III. 22, who had one daughter, IV. 25, and one grandson, V. 38, who again married into the X. stock, VI. 12, and had seven offspring, VII. 12—18. VI. 12, was a blue

¹ The family journal says that he suffered from convulsions 12 to 13 days after birth and that his life was only saved by "oxide of zinc" every half-hour and baths.

² To judge by his portrait, published in a Portuguese journal, he might easily be mistaken for his father, III. 18, so that it is difficult to believe that he is a complete albino, and his father not at least an incomplete albino.

eyed blond. V. 38, gray blue eyes with brown hair, the offspring are normal; the parents are in this case third cousins once removed. Beyond the albino stock already dealt with the third X.-Y. marriage, i.e. that of II. 3 and II. 12 led to a son, III. 24, born 1797, died 1864, he married III. 25, and said he would never allow a child of his to marry a Y. He had eleven children, one of whom, IV. 32 (blue eyes, fine blond), married her double second cousin, IV. 2 (blue eyes, brown hair), whose paternal grandmother was a Y. The offspring of this union, however, were normal, and the grandchildren, although five out of seven marriages have been sterile, are normal. IV. 27, has blue eyes. IV. 33, dark eyes and black hair. IV. 35, blue eyes. IV. 36, blue eyes, fine blond. IV. 39, black eyes, brown hair. The remaining daughter, III. 26, of the third X.-Y. marriage, born 1807, died 1885, appears also to have married out, and to have given rise to 7 children, 28 grandchildren, and 33 great-grandchildren all normal. Of these, IV. 43 was a blue eyed blond; IV. 44, his wife, was the same; IV. 45 had black eyes; IV. 49 was a blue eyed blond with a blue eyed husband; IV. 55 was a blue eyed blond with a blue eyed blond wife, and their son, V. 65, and daughter, V. 67, also blue eyed blonds; V. 65 married a black eyed, brown hair wife; but their two children, VI. 36 and 37, are blue eyed and extremely blond. Of the remaining great-grandchildren no details are given, except that their normality is stated.

Turning back to the albino strain we note that VI. 11 married her first cousin once removed, VI. 10; she has clear blue eyes, and as a child had almost white hair, she is, however, possibly an extreme blond; her husband has blue eyes and blond hair. Of the children, VII. 1 has clear blue eyes, almost white hair but normal eyes; VII. 2, blue eyes, very pale blond hair, normal eyes; VII. 3, blue eyed blond, normal eyes; VII. 4, white hair and blue gray eyes, nystagmus and photophobia, red reflex, has been examined by Dr L. Thurler of Estavayer-le-Lac, who reports him to be a well-marked albino¹. V. 32, the niece of the two albinos in the IV. generation, married, V. 33, an unrelated man; she is a blue eyed blond, and her husband is blond; they have seven children, of whom "one little girl may be considered to be albinotic"; she has white hair and slight nystagmus (VI. 22).

Of those not referred to in the above account: V. 1 was a fine blond (belle blond) with gray blue eyes; V. 4, a blue eyed blond and his wife, V. 5, had black eyes and black hair; their children are: VI. 1, brown eyes, blond hair; VI. 2, black eyes and hair; VI. 3, brown eyes and hair; VI. 4, black eyes and brown hair; VI. 5, gray green eyes and black hair; VI. 7, brown eyes and hair. In the Vth generation, V. 6 had gray blue eyes and blond brown hair; V. 8 to 14 were all blonds with blue eyes; V. 22 was a blue eyed blond and after passing his legal examinations became insane; V. 23, clear blue eyes, extreme blond, and V. 24, her husband, a clear blue eyed blond; their children are the incomplete albino, VI. 11; a blue eyed blond, VI. 12, who has married a man, V. 38, with gray blue eyes and brown hair, with the seven normal children, VII. 12—18; VI. 13, the extreme blond with clear blue eyes, who has married a wife, VI. 14, with black eyes and hair and has four normal children, VII. 5—8; VI. 15, an extreme blond with clear blue eyes, who has married, VI. 16, a blue eyed blond and has three normal children, VII. 9—11. And finally, VI. 17, an extreme blond with blue eyes, who died single. Returning to the offspring of IV. 15 we have in V. 25 another son, who after brilliant studies became insane; V. 26, a blue eyed blond, who married a wife, V. 27, eye colour not stated, and had six extremely blond, blue eyed children, VI. 18; and finally V. 28, another clear blue eyed, extreme blond, with a husband, V. 29, having gray blue eyes and light hair; their four children, VI. 19, are described as blue eyed with blond, *almost white* hair, especially one boy. V. 30, the brother of V. 32, who has an albinotic daughter, is also a blue eyed blond like his sister.

It will be at once evident that this family history is of very great interest, showing a family of marked blondism, passing into incomplete and complete albinism and possibly other forms of degeneracy. We have to thank V. 6 for the splendid work he has done in putting this pedigree together, and for his great courtesy in supplying information. (C. H. Usher, September, 1909.)

Fig. 642. (Fuller pedigree of case in Fig. 609.) Two complete albinos—father and son. Photograph, Plate OO (135). III. 5, male, illegitimate, aged 28 (1909), seen; healthy labourer, height 5 ft. 9 in., weight 11 stone 7 lbs.; married; hair, eyelashes and brows quite white; skin blond, no freckles; iris gray and translucent showing red; pupil red; some red reflex even through sclerotic; nystagmus constant lateral and slow; photophobia marked; no head movements seen; right and left eye together V. without correction reads 12 Jäger; media clear; fundus extremely pale; memory, hearing, smell good; was in a reformatory some years. II. 6, male, father of III. 5, aged 73 (1909), seen; spare-built, height about 5 ft. 2 in.; had no children by his wife (II. 5), who was 40 at marriage, his son (III. 5) was from II. 13; II. 6's hair pale yellow, eyelashes and brows white; moustache yellow white; skin blond, no freckles; iris pale gray blue, showing red, translucent; pupil red; constant slow lateral nystagmus; right and left V. defective; no strabismus; marked photophobia; head movements, none noticed; some lens opacity; fundus extremely pale. II. 13, hair dark; iris greenish brown; never legally married. I. 3, hair brown. I. 4, dark hair and eyes. I. 5 and 6, dark hair and eyes. III. 4, hair brown; iris blue; illegitimate

¹ VI. 11, during pregnancy with VII. 4, had a great fright occasioned by a big fire in the neighbouring country; returning from seeing this fire, she fell into a trench and next day gave birth to VII. 4.

daughter of II. 5, iris green blue; hair dark, and II. 2, dark. II. 3, not albino, had illegitimate daughter (III. 2), brown hair, from II. 5. II. 4, not albino, had illegitimate son (III. 3), brown hair from II. 5. II. 14, dark, from II. 13, had illegitimate son (III. 10), dark, subsequent to her having III. 5. II. 1, dark. II. 7, 9, 10, dark. III. 6 and 8, dark. IV. 1, hair red. IV. 2, fair. IV. 3, died nine weeks, eyes blue, hair fair, not albino. IV. 4, aged 7; no nystagmus, pupils black, iris blue; hair fair. IV. 5, iris blue, no nystagmus, pupils black. IV. 6, died four months; blue eyes. IV. 7, blue eyes, no nystagmus, pupils black. IV. 8, 9, 11, hair brown. IV. 9, died 11 months. IV. 10, hair red. IV. 12 to 16, all dark. (Dr W. Clark Souter, Sept. 1909.)

Fig. 643. Two negro piebalds in a sibship of four and a complete albino in another sibship of the same generation. III. 2, large white patches on skin of trunk and arms; hair black, no white patches; eyes not albinotic, no nystagmus, pupils black, vision good, no photophobia; recently married; was born with the white patches on skin. III. 4, patches of white on skin present from birth; hair and eyes similar to those of II. 2; is an epileptic; vision good, no photophobia. III. 3 and 5, normal natives, the former married recently. III. 6, complete albino, full cousin of III. 2 and 4; her father, II. 4 (Enoch), normal native is brother of II. 2. II. 2 belongs to a tribe who are fairly light skinned (Elephant clan), by his wife, II. 1, had a family, III. 1, all normal; by another wife, II. 3, he had the four siblings (III. 2 to 5), two piebald and two normal. The family live one mile from Thlotsi Camp, Leribe district, Basutoland. (Dr N. M. Macfarlane, 24 Nov. 1909. Fuller records promised on Dr M.'s return to Basutoland.)

Fig. 644. Two albinos in a sibship of six. IV. 12, aged 10, albino, pink pupils, nystagmus, white hair, big healthy boy, very bright. IV. 13, aged 8; IV. 14, aged 6; IV. 15, aged 4; IV. 16, aged 3; all healthy and normal. IV. 17, female albino exposed by mother, died aged 10 weeks; pupils pink, pupils equal and moderately small; irides entirely devoid of pigment, with red reflex, fine grayish white radial striations. No trace of pigment was found in any of the structures of the eyes or other organs. See Plate λ for comparison with eyes of a normal child. A full account of the autopsy will be found in the journal cited below. III. 27, the mother, committed suicide after exposure of the child, apparently from grief at bearing a second albino. III. 22, fair, but not a true albino. III. 24, in an asylum. The father, III. 12, was first cousin to the mother. The relatives as given in the pedigree were all traced and found to be normal. No records made of hair or eye colour of the relatives. (J. E. Adler and T. McIntosh, "Histological Examination of a Case of Albinism," *Biometrika*, Vol. vii., pp. 238—242.)

Fig. 645. This is an attempt to form a pedigree of red hair; the family consists of a number of red haired members, derived from two branches in one of which red, in the other black hair is the dominant characteristic. V. 1—8, the family consists of eight siblings: V. 4—5, were stillborn; V. 2, 7 and 8, have red hair; V. 1, light sandy red; V. 6, a red tinged fair hair; V. 3 alone has black hair. The mother, IV. 12, is dark red; she has one sister, IV. 20, dark red; two brothers, IV. 11 (dead) and IV. 17 are black haired; a sister, IV. 19, who died of consumption, was also black; there is a fair brother, IV. 13, and a fair sister, IV. 15, both married; the first to a black haired wife, IV. 14, has two fair children, V. 9 and 10; the second to a husband of non-recorded hair colour has a single fair child, V. 11. The maternal grandparents, III. 8 and 9, were both only children and both black haired. The maternal great-grandparents, II. 17, II. 18, II. 25 and II. 26, were all black haired. It is not known whether the mother's paternal grandfather, II. 17, had brothers and sisters (II. 16) or what was the hair colour of his parents, I. 9 and 10. His wife, II. 18, however, had two sisters, II. 19 and 20, and two brothers, II. 21 and 22, all black; and their mother, I. 12, was black, though nothing is known of their father, I. 11. The mother's maternal grandfather, II. 25, had both his parents, I. 13 and 14, black; he had a black haired brother, II. 23, but a fair sister, II. 24. The mother's maternal grandmother, II. 26, had six sisters, II. 27, and one brother, II. 30, black haired like herself, but two fair brothers, II. 28 and 29; the mother, I. 16, of this family was black, but the father, I. 15, dark brown. This constitutes all that we have recorded of the black haired maternal family. The father of the red haired family, IV. 10, was himself light sandy red. Of his siblings, IV. 1, 4, 5, 6, 8 and 9, were dark brown; IV. 2 had a reddish tinge; IV. 3 was dark red; and IV. 7, fair with a reddish tinge. The paternal grandparents, III. 2 and III. 5, were light sandy red. The paternal grandmother had a sister, III. 6, and a brother, III. 7, both dark brown, and her parents, II. 12 and II. 13, are respectively fair and black; the father's maternal grandmother, II. 13, came indeed of black haired stock, she had II sisters, II. 14, and three brothers, II. 15, all black, and her parents, I. 7 and 8, were both black. Of the father's maternal grandfather, II. 12, less is known, his parents, I. 5 and 6, were fair, but the hair colour of his brother, II. 11, is unknown. The paternal grandfather had a black haired sister, III. 1, now dead. The father's paternal grandparents, II. 3 and 4, are believed to have been both red, but of the two sisters, II. 1 and 2, and of the parents, I. 1 and 2, of II. 3 nothing as to hair colour has been recorded. II. 4, who was light red was married three times; by her second husband, II. 5, who had black hair, she had a brown haired child, III. 3, and by her third husband, II. 6, a red haired man, a reddish haired child, III. 4. She had two sisters, II. 7, red, and II. 8, light red; one brother, II. 10, was light red, and the hair colour of the other, II. 9, is not recorded. The mother, I. 4, of this red group had

reddish hair ; that of the father, I. 3, is not known. Thus we have four red \times red matings : IV. 10 \times IV. 12 ; III. 2 \times III. 5 ; II. 3 \times II. 4 ; and II. 4 \times II. 6 ; with probably a fifth, I. 3 \times I. 4. Of these it would appear that the second has decidedly not produced all red haired individuals ; the third probably also did not, the fourth and fifth may possibly have done so, and there is one exception asserted to hold. All living members of Generations III., IV. and V. were personally examined. The pedigree appears to show (1) that red hair is markedly inherited ; (2) that two reds do not necessarily lead to red offspring ; and (3) that dark red can appear in a black stock. (Dr Harold G. R. Jamieson, June, 1909.)

Fig. 646. One complete albino. V. 9, girl, aged 8 (1909), seen ; had fits in infancy, healthy, head held to right ; hair white, brows and lashes very pale brown ; skin blond, no freckles ; iris blue ; pupils red ; constant lateral nystagmus ; slight divergence of left eye ; refraction right eye My. $\cdot 5$ D. oblique meridian and H. $2\cdot 25$ D. in opposite meridian, V. corrected $\frac{6}{36}$; left eye Emm. oblique meridian and H. $2\cdot 25$ D. in opposite meridian, V. corrected $\frac{6}{24}$ partly ; fundus typically albinotic ; height 44 in., weight 46 lbs. Mother (IV. 5), hair brown, blue eyes. Father (IV. 4), hair very dark, eyes blue. Mother's father, not given on pedigree ; fair, blue eyes. Mother's mother, not given on pedigree ; brown hair, blue eyes. III. 2, very dark, eyes brown, illegitimate. III. 12, hair dark brown. II. 8, brown hair. II. 9, not fair. II. 3, not albino. II. 1, no information. V. 2 to 11, all blue eyed, most fair. V. 6, hair dark brown, mixed astigmatism, pale fundus. II. 2 and III. 3 and 4, no details, not albinos. II. 7 and III. 7, rather dark families. II. 10 and III. 23, many blue eyed, none very fair. IV. 1, dark, illegitimate. V. 1, no information. III. 5 and IV. 15, no albinos. III. 8 to 22, all blue eyed, none very fair. IV. 16 to 33, and V. 21 to 24, medium. IV. 3, 6, 7, 9, 11, 13, generally hair dark, eyes blue. V. 14, illegitimate, very fair. V. 15, medium. V. 16 and 17, dark. V. 18 to 20, eyes blue, hair brown (18 and 20), red (19). V. 12 and 13, medium. The mother's stock is not recorded on the pedigree, it was, however, worked out to great-grandparents, and down from these through four generations involving more than 500 individuals without trace of albinism. (Dr W. Clark Souter, Sept. 1909.)

Fig. 647. I. 1 and 2 both dark hair and eyes. No information about their ancestors ; they are said not to be related by blood. II. 1, aged 18 (Dec. 1909), intelligent, hair, eyebrows and lashes white and have always been so ; irides gray with lighter-coloured rays ; pupils almost black when contracted as they were when examined, but the lad says people generally tell him his eyes are pink ; marked photophobia ; wears strong tinted, convex spectacles ordered at an Eye Hospital (he must therefore have considerable H.), and sight is defective ; eyes unsteady (probably nystagmus). Is eldest born of four, all living, the other three (sexes not recorded) said to have dark hair and eyes. (Case sent by Mr T. Benson, C.S.I. retired, of Tavistock. The lad was in the Cottage Hospital and Mr Benson, who is one of the House Committee, examined the lad on 13th and sent E. N. the above notes, Dec. 15th, 1909.)

Fig. 648. Two complete albinos in the same sibship. II. 2, boy, from Bandawe, Nyassaland, aged 10 to 14, fairly well nourished ; hair of head white ; legs and feet of darker hue than rest of body (when seen by Dr Brown three years ago skin was pinkish and covered by small elevations (not pigmented) which produced an exaggerated appearance of "goose skin") ; photophobia ; iris brown ; pupils normal. II. 1, an older brother, an albino died two years ago (seen by Dr Brown). II. 3, others in same sibship—all normal. These notes and accompanying photos were supplied by Dr B. H. Robertson, of Bandawe : see Plate OO (137). (Dr A. Brown through Dr Alex. Low (Aberdeen), Dec. 1909.)

Fig. 649. One albino in a sibship of one. III. 5, boy, aged 11 (1909), seen ; is deaf and dumb ; hair generally quite white except black spot about $\frac{1}{2}$ " diameter near the crown present since birth, now a number of small tufts and odd black hairs over head and in eyelashes and eyebrows, all of which mother says have come lately ; iris streaky dark blue at periphery, round each pupil a white ring (not clear colourless) from which white streaks radiate into blue part ; no nystagmus ; pupils very small, one slightly uneven, dark, react feebly to light—V. : "is a little short-sighted." Mother, II. 6, hair dark ; eyes dark hazel. Father, II. 5, dark hair ; brown eyes. I. 2, hair and eyes dark. I. 3, dark hair ; light eyes. I. 4, rather fair. II. 7 and 8, dark, no offspring. II. 1 to 3, dark. II. 4, fair, eyes light. III. 1, fair. III. 2 and 3, dark. III. 4, very fair, but not albinotic. (Dr Heron, Dec. 1909.)

Owing to the kindness of the Superintendent of the institution where this boy is, C. H. Usher saw him (Jan. 30, 1910), and made the following notes : As far as the skin is concerned, he appears to be a complete albino ; there are no darker parts of skin nor moles on the body or limbs anywhere. The hair is completely albinotic with the exception of the tufts of black hair (specimens of both kinds sent). The largest tuft is on that part of head where baldness commonly commences, i.e. in mid-line at posterior part of crown ; next in size is a black tuft in mid-line in front of first tuft. Nine other tufts were counted, some consisting of only 2 or 3 black or dark hairs ; more are on the left than on the right side of the head and they do not correspond with the distribution of any special nerve. The iris stroma is quite devoid of pigment and has a remarkable appearance, chiefly due to the opaque white area of pupillary

region, which is smaller than the ciliary area of iris, that having a dark blue gray appearance. The stroma then is pigmentless, but the layers on posterior surface of iris are well pigmented as shown by a well-marked ring of brown pigment at pupillary margin; and there is no red seen in pupil or through iris. The pupils are exceedingly small, about $\frac{1}{2}$ mm. in diameter but contract to light. Fundus could not be examined; with a magnifying glass a very fine nystagmus seemed perceptible. The boy apparently sees quite well. The Superintendent says the boy is intelligent and has the average physical vigour of his age.

Fig. 650. Three albinos in a sibship of six. Nothing known of parents I. 1 and 2. II. 1, albino, aged 60, married to normal woman and has had one female normal child now dead. II. 3, normal woman with dark hair, married, with three normal children. II. 5, female albino, married a normal man, and has a single normal daughter. II. 7, female, "born insane." II. 8, male, black hair. II. 9, female albino. Family from the Fuseherred in Midhordland, Norway. (Dr V. Magnus, Christiania, Dec. 17, 1909.)

Fig. 651. III. 1, is Le Vallois' "Pyed Mulatto Boy," Jean Pierre. He was born at Grandterre, Guadeloupe, of a negro wench Carolina, II. 4, and a white European man, II. 3, who had white spots, that is of a deeper white than his natural skin, of the same shape and in the same parts of his body as his son. One of the father's brothers, II. 2, had the like white spots, and so had the mother, I. 2, of both. This piebald grandmother of the piebald mulatto is said to have been "frightened on having some milk spilled upon her" during her pregnancy with II. 2. We have in this pedigree inheritance of piebaldism from white to mulatto. The case is described by Arthaud and Morgan: see our Chapter on Piebalds, Case 9.

Fig. 652. Three albinos in a sibship of seven. IV. 4, female albino died aged 13; IV. 5, dark hair, blue eyes, married and has three normal children; IV. 6, blond hair, blue eyes; IV. 7, male albino, died aged 17; IV. 8, female albino, yellow white hair, red eyes; IV. 9, died a few days old; IV. 10, red-blond hair, blue eyes. The father, II. 7, has black hair and blue eyes; and the mother, II. 16, light hair and light blue eyes. The brothers and sisters of the parents with their offspring as given on the figure are all normal, but the family knows that seven generations ago there were albinos in the stock of the maternal grandfather, I. 3. Grandparents and parents were not consanguineous, and there is no known consanguinity. Family from Follaug near Skien, Norway. (Dr V. Magnus, Christiania.)

Fig. 653. Two albinos, one male and one female, II. 3 and 5, in a sibship of five or six. The albinos are said to have alternated with normals. II. 2, normal sister was married and had a normal family. II. 6, uncertain whether this represents one or two additional offspring, and whether one of these was not also an albino. The father, I. 2, has dark brown hair. No particulars as to mother, consanguinity or grandparents. (Case from Melbourne, Victoria, through E. N.)

Fig. 654. Four albinos in a sibship of seven. I. 1, a healthy man, aged 40, fair with blue eyes; I. 2, a healthy woman, aged 38, fair with brown eyes; I. 1 and 2 are first cousins. II. 1, aged 18, dark; II. 2, albino boy, lived five months, died of "consumptive bowels"; II. 3, albino girl, aged 16; II. 4, boy, aged 15, dark; II. 5, albino girl, aged 10; II. 6, boy, dark, died at five months "vomiting and wasting"; II. 7, albino girl, aged two, brought to the reporter of the case, as suffering from vomiting and wasting, but made a "good recovery." Bright and good tempered. The two elder albino sisters had glossy flaxen white hair; irides devoid of pigment; lateral nystagmus, glasses for myopia, photophobia. No cause assignable beyond cousinship; "there had been no albinos in the families of either parent." (J. R. Day, *The Monthly Homoeopathic Review*, London, 1897. Vol. 41, pp. 148—9.)

LIST OF CONTRIBUTORS OF NEW MATERIAL.

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DESCRIPTIONS OF EXTRA PEDIGREE PLATES

Plate LV. Fig. A. A complete albino female. IV. 4, female (E. A.), age 1 year 11 months (1910), seen, well nourished, lively child, talks, is illegitimate; skin, blond all over (stripped), three spots on brow remaining after chicken-pox, no freckles; hair white at deep parts, rest yellowish; lashes and brows quite white; eyes, acute muco-purulent ophthalmia (both); constant lateral nystagmus; pupils marked red reflex; internal concomitant strabismus of left eye; refraction of each: mixed astigmatism, myopia in vertical meridian, hypermetropia in horizontal meridian; iris blue-grey, translucent, on ophthalmoscopic examination red reflex seen through most of iris and margin of lens and ciliary processes are visible; fundus typically albinotic. Mother (III. 7), age 35 (1910), seen, iris blue, no nystagmus, hair brown, not dark, servant at a farm, single, has had no other child. Father (III. 2) not fair; by his wife (III. 1) had eight children (IV. 1, 2, 3) all dark; the oldest (IV. 1) said to be about same age as III. 7. III. 3, dark. II. 5, fair, not albino. II. 4, dark. II. 6, died as infant. I. 1, and I. 2, dark. I. 3, died soon after marriage, no information as to colour of hair. I. 4, not albino, died aged 94. II. 1, and II. 2, dark; III. 4, 5 and 6, dark. II. 3, some are dark, some fair, all had families, no particulars. III. 8 and his children (IV. 7 and 8), dark; IV. 9, ?dark, certainly not albinotic. III. 9, dark; IV. 10 and 11, dark. IV. 10, dead. III. 10, fair, eyes blue, died at 19 of phthisis. III. 12, seen, half brother of III. 7, married twice, is dark, by first wife (III. 11) had nine children (IV. 12 to 15), all were fair, but none "blind-fair." IV. 13 and 15, died in infancy; by his second wife (III. 13) had IV. 16, dark. III. 14, half sister of III. 7, hair auburn. IV. 17, hair brown. In Plate interchange 1st W and 2nd W in Generation II.

This information has been obtained from III. 7, III. 12 and a woman (not related) who takes charge of the child (IV. 4). (C. H. Usher, September 13, 1910.)

Fig. B. A complete albino male. II. 4 (J. Th., from Cumberland), age 4 (1910), seen, hair white; brows light yellow-brown; lashes same as brows, but darker; skin blond, same over whole of body and limbs (stripped); on left forearm at junction of upper and middle thirds over supinator muscles a nearly circular mole, diameter = 8 mm., is slightly raised, rough, light brown and has long hairs on it; no freckles; head large (?hydrocephalic), circumference not procurable; child slavers constantly; parents say child does not behave differently from other children; eyes, iris blue; pupils red; constant, lateral nystagmus; photophobia; alternating divergent strabismus; refraction of both eyes: myopia in vertical meridian, hypermetropia in horizontal meridian; holds objects close to face; oph. fundus very pale; choroidal vessels very distinct. I. 2, mother, age ?; hair dark brown; iris dark brown; has a large *goitre*. Father, age ?; hair yellow-brown "as light as II. 4's when young," iris blue, no nystagmus; good vision. II. 1 (R. E.), illegitimate (same mother), iris and hair brown. II. 2 (M. A.), hair brown, iris blue. II. 3 (M.), hair light yellow, skin blond, iris blue. II. 5 (D.), hair yellow-brown, iris brown¹. (Dr T. McMaster Glen, September 20, 1910.)

Fig. C. An illegitimate male child, complete albino. V. 13 (J. A.), age 5 (1910), seen, a strong, healthy boy; skin blond, no freckles or pigment patches (stripped); hair, eyelashes and eyebrows quite white; slight lateral head-movements; iris grey and translucent; marked red reflex in pupils and through iris; marked photophobia; constant lateral nystagmus—rate 132 per minute; no strabismus; on ophthalmoscopic examination, edge of lens and ciliary processes visible through iris; no part of iris is as red as pupil; fundus typically albinotic; optic disk much darker than fundus generally. Mother (IV. 31), blue iris; no nystagmus; hair brown; has two other illegitimate children, (1) V. 19, male, age 6 (1910), iris blue, fair hair, no nystagmus, good vision, by IV. 36, and (2) V. 18, age 4 months (1910), iris brown, hair dark, no nystagmus, by IV. 32. Father of albino, IV. 7, himself illegitimate, hair red, iris blue, screws eyes up, does not like the sun, is eccentric, has another illegitimate child, V. 11, boy "with very curly hair and swarthy complexion (almost bronze)" by IV. 12, his first cousin, who has dark hair and bronze complexion. III. 31, dead, not very fair; eyes blue. III. 28, hair very dark; eyes blue. III. 5, bed-ridden; eyes blue; hair formerly fair. III. 2, dark; eyes blue. II. 14 and 15, said to have been neither dark nor fair. II. 11 and 12, both dark. I. 1 and 2, both dark. II. 4 hair fair; blue eyes. II. 3, hair brown; eyes blue. II. 1, blue eyes. II. 2 and 5, fair hair; eyes blue. II. 6 to 10, none fair; of these only II. 8 has offspring. II. 13, a family, no particulars. III. 1, fair; eyes blue. IV. 1 and 3, all fair, eyes blue. IV. 2 and 4, all dark, eyes blue. III. 4, hair brown; eyes blue. IV. 5, grey-blue eyes. V. 1, hair brown; eyes blue. III. 3, hair brown (marked in the original draft pedigree as an incomplete albino, but the reason for this is very doubtful; possibly in error for IV. 7). V. 2 to 5, all blue eyes;

¹ Owing to a misreading on part of draughtsman II. 4 and 5 have been erroneously marked as dead.

hair "nearly white." IV. 8, iris hazel; hair brown. IV. 9, dead, hair red; iris blue. IV. 10, dead, fair red hair; eyes blue. V. 6, very dark. V. 7, hair red. V. 8, hair yellow. V. 9, single, very fair flaxen hair. VI. 1, dark. VI. 7 and 8, very fair; eyes blue. VI. 9 to 11, not fair and not dark. IV. 11, family of six, no particulars, some had families (V. 10). III. 7, one iris blue, other one half blue, half brown. III. 8, brown hair; blue eyes. IV. 13, family of 12, no particulars. III. 9, hair brown; eyes blue. IV. 14 and 15, and V. 12, hair brown. III. 11, blue eyes, had two families (IV. 16 and 17) of five and three, no particulars. III. 14, abroad. III. 16, dead. III. 17, died age 2. III. 19, "red fair," married twice; a child by each marriage (IV. 19 and 20), no particulars. III. 22, no information. IV. 21 and 22, "red fair." IV. 23, others, no particulars. III. 24 to 30, all dark. III. 27 and 30, all died young. III. 29, s.p. IV. 24, illegitimate, dark. IV. 25, dark. IV. 26, dark. IV. 27 and 28, fair, eyes blue. IV. 29 and 30, dark, eyes blue. V. 14 and 15, blue eyes and fair, but not albinos. V. 16 and 17, not albinos. III. 32, hair yellow; eyes blue, married, s.p. III. 36 and 37, dark. IV. 34 and 35, no information. This pedigree is of much interest as combining red hair, great fairness and albinism. Photographs of IV. 31 and V. 13. (C. H. Usher, March 16, 1911.)

Fig. D. I. 2, man (at Malaga, Spain), age 25, married, has sisters (I. 3), "and but one brother (I. 4) like him," hair white; "moving blue eyes with white pigment"; scrofulous; seems to be very clever; he said "I am an albino, and there are two more at Coin."

Coin is a little town in the neighbourhood of Malaga. Postcard from Mlle Volmar, 1910.

Fig. E. A case of partial albinism¹ in a sibship of five where all had red hair. II. 3 (M. S., Bauff), age 11 (1910), seen; hair red; eyebrows almost white; pale skin; blond complexion; iris grey with faint anterior pigment pupillary circles of red (same colour as hair); refraction—R. H. 3 D. V. with correction $\frac{5}{12}$; pupil not pink; no nystagmus; no special pallor of fundus; L. H. 1.5 D. V. with correction $\frac{5}{2}$; mother (I. 4), hair flaxen; eyes grey, right no anterior pigment; left, one $\frac{1}{2}$ mm. brown pigment spot in pupillary zone down and out; she says her five children (II. 1 to 5)—two dead (II. 4 and 5)—were all red haired and her brothers and sisters (I. 5 and 6) were equally divided between light and dark (some Dr Galloway remembers as having pale eyes and fair hair). Father (I. 3), hair very dark; grey eyes, a first cousin of his wife (I. 4); I. 1 and 2, dark. (Dr A. Rudolf Galloway, March 5, 1910.)

Fig. F. Albinos from Broken Hill, Rhodesia (see pp. 315 and 316, particularly for analysis of hair pigmentation). I. 1, Chicvolelele, aged about 55 years, dark brown. He has leprous-like spots all over him. Pupils brownish, irides brown, and arcus well marked; no nystagmus. The family came from region of Broken Hill in N.W. Rhodesia, and is now living about 25 miles north of there; altitude about 4000 ft. above sea level. No history of previous cases discoverable, in either father's or mother's stock. Father said "God sent it." The native's call them "Chisweta," *i.e.* red folk. They are also called "Awasweta." I. 2, the mother, Neugosa, aged about 40 years, skin brownish; eyeballs whitish but spotted; eyes steady; irides, brownish with dark outer rings. She is again pregnant. She is a healthy looking woman. II. 1, male, Nzeche, the oldest albino is aged about 18 years, well developed, height about 64"; in behaviour none of the shyness of a native towards Europeans. The skin is coarse and reddish, almost horny in roughness. Purple blue patches in places especially on the back of the legs at the knee-joint, and more pronounced still on back of thighs. There was complete absence of nipples, no trace of them. Hair of head, eyebrows and lashes yellowish. Eyeballs perfectly white, a marked contrast to spotted eyeballs of parents; irides greyish green with whitish rings inside; upward lateral nystagmus, normal reaction to light; great photophobia. II. 2, female, Nkondi, aged about 10 years; same albinotic appearance as in II. 1, same pinkish spots especially on face, upwards lateral (?) nystagmus, more marked than in II. 1 and 3; eyeballs white; same greenish irides as in II. 1 and 3. II. 3, Chisasula, aged about 8, albino boy, not so pinkish as II. 2, almost dirty white. Pinky spots on back and abdomen; scabs in various places, but skin not so rough as in I. 1; coarse on back; absence of bluish spots except on shins. Hair yellow; eyeballs white, irides greenish, reaction normal; lateral nystagmus. (Photographs and hair samples. Dr Alexander Brown, through Dr Low of Aberdeen.)

Fig. G. Two albinos in a sibship of five, all living. Possible influence of ill health combined with marked blondism in the mother. III. 5, mother of the albinos IV. 5 and IV. 7, eyes blue, hair now brown but described as having been "very fair" when she married at 20 (July, 1871); eyebrows and lashes always darker than hair of head. She went from England to India and married after being there seven months; climate never suited her and she had perhaps begun to suffer from it when first child (IV. 5), albino, was born August, 1872; returned to England December, 1872, for a year and improved in health; second child (IV. 6) born September, 1874, in India, fair hair, blue eyes but not an albino; mother remained in India until 1877, although still suffering from the effects of the climate, the third child (IV. 7), albino, being born in India, August, 1876; in 1880, as mother "could no longer stand the climate of India" her husband brought her home for good with her three sons; in 1881, fourth child (♀), IV. 8, born in England, and in 1883 fifth and youngest, IV. 9, also ♀. Both IV. 8 and IV. 9 had and still have fair hair and blue eyes with dark eyebrows and lashes, and good sight. Thus all the five children were fair whilst the two born when the mother was feeling the bad influence of the Indian

¹ This albino should have been marked with symbol for partial albinism in plate.

climate most definitely were albinos. The mother's three sisters (III. 2, 3, 4), very fair, her only brother III. 1, very dark; of their children (IV. 1, 2, 3), some are fair, some dark. II. 1, was very fair, II. 2, dark hair, "hazel" eyes. The father (III. 9) of the albinos was one of ten (8 ♂, 2 ♀), his exact place not stated but he was the sixth son; he was 34 at marriage (1871), has blue eyes, and as a boy had fair hair; of his nine siblings five (3 ♂, 2 ♀) were fair, the others (4 ♂) dark; he is now the only survivor; III. 6, the eldest son of the sibship, dark, married his first cousin III. 18, and had five sons and five daughters (IV. 12, 13), none albinotic. III. 7 and 8 had seven children between them, all normal; III. 13 and 15, both fair, were married but no issue. Their mother (II. 3), dark, their father (II. 4), fair. The latter had a sister, II. 5, whose daughter III. 18, married her cousin III. 6. It is not stated whether II. 4 had other siblings than II. 5. V. 1, aged 12 months, brown hair, blue eyes. Of the two albinos IV. 5, now 38 (1910), appears from the account received to be complete with quite white hair, nystagmus and defective sight; Mr Higgins in 1899 found refraction of R. H. 6 D. vertical, 8 D. horizontal; L. H. 6 and 7 D. respectively and V. with correction $\frac{6}{30}$. The other albino (IV. 7), now abroad, is said to have better sight than IV. 5, and to have "more pigment in the eye" and no nystagmus, but like IV. 5, to have quite white hair except a slight tinge of yellow in the moustache. In this genealogy, which belongs to the educated professional class upon both sides for several generations, full enquiries have been made and no other cases of albinism have been heard of; the actual colouring in Gen. I., however, is known only for I. 2 and I. 4, both of whom were fair. (E. Nettleship, December, 1910.)

Fig. H. Consanguinity with albinism in two generations. Family Sch. There are no details of any individuals in the pedigree given in the published account except IV. 9, an albino boy aged 6 years, said to be a complete albino of skin, hair and both eyes. Vision merely $\frac{6}{60}$ after correction. The main part of the paper is taken up with a discussion of the bearing of the pedigree on Mendelism, which is illustrated by the suggestion that the brother, II. 4, has the dominating character (Pigmenthaltigkeit) so "ueberwiegend" that in his descendants only pigmented individuals can be found, while the brother, II. 2, has the recessive character "in grosser Menge vorhanden" so that in his descendants seven albinos occur. It is needless to say that such an explanation is not only non-Mendelian, but destroys all the possible evidence for Mendelism in the pedigree. With proper Mendelian interpretation, all three brothers must have been *alike* heterozygous (DR.), and so must the non-consanguineous wife, II. 3; and the non-consanguineous husband, III. 2. (Tertsch's Case. Demonstration before "Ophthalmologische Gesellschaft" in Vienna, *Zeitschrift für Augenheilkunde*, Bd. xxv. S. 107—8. Berlin, 1911. Details of the family had been previously communicated to E. Nettleship in a letter of November 23, 1910, by Prof. E. Fuchs, of Vienna.)

Fig. I. "Whilst I was there, the son of an Ethiopian king arrived from far inland to see those whom he called his kinsmen. For he was the son of a black man and a black woman, and nevertheless he was white and fair. He brought with him one of his black brothers, a fine boy, with some slaves. They both came to see me in my 'paillote,' telling me how, that, hearing there were men, white like himself, in Mozambique, they had come expressly to see them. The Portuguese received them very well in order to have the entry into their father's country for trading purposes. It was said that the mother had had two other children white like himself; but his father seeing them thus, had killed them, saying they must be by somebody else and not by him. When this one was also born of the same colour, the father still wished to put an end to him, but a friend had prevented him, saying it had happened through divine permission and thus his life was saved. His mother must have been thinking of the white men who were said to be in Mozambique, or it must have occurred through some other fancy. However it may be, I saw that this was a fairly handsome son, not even 'haslé' (?hâlê), nor burnt by the sun, he was aged about 20, while his black brother was aged about 18. They visited me twice or thrice in my paillote, and I gave them what I could to eat and drink, with which they were well content. I was surprised he had run the risk of coming so far to see white men whom he called his kinsmen." (Jean Mocquet, *Voyages en Afrique, Asie, Indes orientales et occidentales*. Rouen, 1645, Livre iv. pp. 254—7.)

Fig. J. A male with albinism of eyes and dark hair. II. 3, male (H. B. A.), seen, grocer, Aberdeenshire, age 18 (1911). Hair quite dark brown with perhaps a reddish tinge; skin fair; constant lateral nystagmus; pupil red; refraction (mydriatic used) R. hypermetropia 4 D. in an oblique meridian and myopia 2.25 D. in meridian at right angles to it. V. with correction = $\frac{6}{24}$. L. hypermetropia 2 D. in an oblique meridian and myopia 4 D. in meridian at right angles to it, V. with correction = $\frac{6}{60}$; fundus typically albinotic: optic disk looks darker than rest of fundus; iris blue, no pigment in stroma. He supplies the following as regards his relatives: Mother (I. 3), hair brown; eyes blue. Father (I. 2), hair and eyes dark. II. 1, oldest in sibship of seven, hair dark brown, eye colour not known. II. 2, hair brown, eyes blue. II. 4, hair dark brown. II. 5, hair black, eyes dark. II. 6, fair hair, blue eyes. II. 7, youngest in sibship, hair dark brown, eyes dark. I. 1, very fair. A second or third cousin not represented in the pedigree is very fair. He (II. 3) knows of no relative with "moving eyes" like his own or any who are "too fair." (C. H. Usher, March 29, 1911.)

Fig. K. This is a pedigree of red hair. Full inquiries were made as to ancestry of I. 1 and I. 4, but no red hair was known. There was also no red hair discoverable in the ancestry of II. 1, II. 4 and

II. 6. The hair of III. 5 was reddish chestnut. The different nature of the offspring in the case of the brother I. 3 and the sister I. 2 is noteworthy, and the curious manner in which red hair has reappeared in Generation III, where three apparent normals have married normal individuals, is still more remarkable. (H. J. Laski, January, 1911.)

Fig. L. The patient (IV. 9), F. T., aged 14 years (1910). General health good. Mental capacity very good. Hair white. Iris light blue. Constant lateral nystagmus. Refraction: R. vertical meridian my. -10 , horizontal meridian -7 . L. vertical meridian my. -10 , horizontal meridian -6 . Vision = 60 at 2 metres, corrected = $\frac{6}{60}$. Fundus typically albinotic. Considerable photophobia. IV. 9 has one brother IV. 8, seen, 17 years old, normal. Light hair and grey iris. One sister, IV. 10, seen, 11 years, normal. Light hair and grey iris. The mother, III. 15, seen, and from her history was obtained. Light hair and grey iris. Slightly deaf. Otherwise normal. III. 15, has five brothers and two sisters. All fair except one brother who is dark. One sister wears glasses, but sight is not very bad. All seven are married, and all have normal children. II. 2, was dark; died suddenly, cause unknown. II. 1, was light; died from some gastric trouble. IV. 9's great-grandparents on the mother's side of the family are known not to have been albinotic. Patient's father, III. 16, is dark; still living; normal. He has three brothers, III. 17, 19, 21, all living; one is light and two are dark. Two brothers are married, with normal children, IV. 11 and 12. He has two sisters, III. 22 and 24, both very dark. One sister, III. 22, is married, unknown whether with issue or not. II. 3, was dark. He died of a liver complaint. II. 4, was light. She died from a stroke. IV. 9's great-grandparents on the father's side of the family are known not to have been albinotic. III. 15, states that she has frequently enquired amongst other members of the family without being able to find any other instance of albinism. She is quite sure there is no consanguinity between herself and her husband. (Dr R. A. Askins, July 14, 1910.)

Fig. M. Three male albinos in a negro sibship from Bandawe, Nyassaland. III. 3 is a young slim lad of about 19 years of age, repulsive to look at. Skin is more or less shrivelled up, and of pinkish hue. Eyes are pale blue; hair and eyebrows are iron grey to creamy white. II. 1 and 2 are both black with no spots. The family consisted of three only, I. 1 died when born, I. 2 lived one to two years. Nothing known of ancestry of II. 1, but I. 1 was black without spots and I. 2 supposed to be normal. Photographs, from Mrs J. F. Young through Dr Souter. The pedigree does not seem the same as that of Dr Robertson, Fig. 648 and Plate PP (142), but the photographs show considerable resemblance, if not enough to assert identity.

Fig. N. This is another pedigree of Hereditary Leucoderma, see pp. 203—5 of text. Information chiefly from II. 7, from the family medical man and from the consulting ophthalmic surgeon. In one or two cases, II. 7 described the condition as premature greyness, but as the medical man reported actual leucodermic patches in some of these instances, there can be little doubt that they were really all leucoderma. The "premature white hair" comes from I. 1, but we have no information as to when it started. I. 1 died of heart failure about 70 years old. II. 8 died at 58 of heart disease and Bright's disease. II. 7, aged 48, hair turned grey at 16, now quite white; there is no leucoderma of eyelids or face, but there is on lower part of neck and upper part of chest. Eyelids and eyelashes black; irides once described as greenish-brown once as brownish-yellow; fundus slate-coloured, and shows no pathological change. R. E. + 2 D. sph./+ 2 D. cyl. axis 65° ; L. E. + 3 D. sph./+ 2 D. cyl. axis 65° . Vision R. $\frac{6}{18}$, L. $\frac{6}{24}$. Has suffered from photophobia for the past fifteen years, moderate in degree. An elder sister, II. 5, and a younger sister, II. 9, aged 50 and 46 respectively, lost their hair pigment like II. 7. II. 5 has no children, II. 9 has one son, reported normal. Of the children of II. 7, III. 1, aged 26, has white hair, III. 2, the son, aged 25, is reported normal. III. 3, aged 21, has leucotic patches on back of hands and neck, and her hair, naturally very dark, began to turn white when she was 13.5 years of age. She has light grey green irides, and suffers from photophobia; the latter especially from electric light, so that she wears amber glasses when attending college lectures. II. 4 died at 36, but II. 1 and 2 are alive at 62 and 54 respectively. The noteworthy feature of this pedigree seems to be that the leucoderma has affected only the females of Generations II. and III., but all of these. (K. Pearson, November, 1910.)

Plate LVI. Fig. O. Female with albinism of eyes in a stock where there is a prevalence of scanty pigmentation. VI. 12, female (W. St.), seen, age 10 months (1910); iris blue, no stroma pigment; constant lateral nystagmus, more marked in right than left eye, noticed by parents when a few weeks old; oph. media clear; fundus normal, pale, choroidal vessels seen distinctly; red reflex in pupil; refraction R. emmetropia in vertical meridian, hypermetropia 3 D. horizontal meridian; L. myopia .5 D. vertical meridian, hypermetropia 1.5 D. horizontal meridian; hair, lashes and brows brown, not particularly fair for this age; skin not blond; it was a feeble baby, but no fits; no head nodding. Mother, V. 41, fair, iris blue, fundus pale. Father, V. 13, hair light brown; iris blue. IV. 35, hair brown, fair formerly; iris blue; fundus normal. IV. 24, dark, hazel eyes. IV. 11, brown hair; blue eyes. IV. 6, blue eyes. III. 18, age 73, eyebrows yellow; hair grey, formerly yellow; iris blue; fundus normal. III. 17, fair hair; hazel eyes. III. 13, iris brown; hair dark; first born. III. 10, dark. III. 5, blue eyes; brown hair. III. 4, very dark. III. 2, dark. III. 1, known to have had blue eyes. II. 11 and 12, both fair with blue eyes.

II. 10, dark. II. 8, dark. II. 7, no information. II. 5 and 6, no information as to eye and hair colour. II. 4, not dark, nor fair. II. 3, dark. II. 2, not albino. II. 1, "black hair and eyes." I. 6 and 7, not dark, nor fair. I. 5 and 4, had good vision. I. 2 and 3, dark. I. 1, "a black woman," country unknown. VI. 11, blue iris, fair hair. VI. 10, two miscarriages. V. 42 to 45, all blue eyes and all fair hair in childhood, got darker later. VI. 27 and 28, blue eyes; hair brown. V. 10, dark. VI. 1 and 2, "crow black"; eyes blue. VI. 3, hair and eyes brown. V. 11, fair; blue eyes. VI. 4, hair golden; eyes blue. VI. 5, hair red; eyes blue. V. 12, dark, ob. VI. 6, dark. VI. 7, fair. V. 14, blue eyes; moustache yellow, hair light brown, formerly white, defective sight. VI. 8, dark eyes. V. 15, eyes blue, golden hair, died at four or five. V. 16, hair dark; eyes blue. VI. 9, all fair; eyes blue. V. 17 and 18, died young. V. 19, fair; eyes blue, dead. II. 9, blue iris. II. 13, not fair, nor dark. II. 14 and 15, hair and eye colour not known. III. 21 and 22, families, no particulars. III. 3, very dark. IV. 8, both dark. III. 6, had family of eight (IV. 14 to 16), all dark, four were deaf and dumb. V. 30, a family, no particulars. III. 7 and 8, fair. IV. 17, all fair. III. 11 and 12, dark. III. 14, dark; blue eyes. III. 15, brown hair, married twice, members of both his families (IV. 31, 32, and IV. 33, 34), all dark, all in first family (IV. 31, 32) had offspring—no particulars, none in second family with offspring. III. 16, others, no information. III. 19 and 20, fair; eyes blue. IV. 44 and 45, all blue eyes, one, at least, of IV. 44 had fair hair. IV. 46 and 47, all fair with blue eyes; no offspring known. IV. 1 to 7, hair ordinary shade of brown. IV. 5 to 7, blue iris. IV. 7, single. V. 1 and 2, not fair, nor dark. V. 2, dead. V. 3, no information. V. 4, red hair. V. 5, light hair, eyes blue. V. 6 and 7, red hair. V. 8, dark. V. 9, none albino. IV. 9, 10, 12 and 13, dark. V. 20, no information. V. 21 to 25, all dark except V. 24, who is fair with blue eyes. VI. 13, not fair. VI. 14, 15 and 16, no particulars. VI. 17, dark. VI. 18, both fair. V. 26, no particulars. V. 27, dark. V. 28, fair. V. 29, dark, "skin red," broad nose, died at 6 months, his features supposed to have descended from I. 1, the "black woman." IV. 18 and 19, not albino. III. 9, dark. IV. 20 to 30, all dark, except IV. 21, medium, and IV. 30, eyes blue. IV. 22, died young. V. 31, hair brown. VI. 19 and 20, no particulars except not albinos. V. 33, fair; blue eyes, dead, wore spectacles. V. 34, died young. V. 35, H. astigmatism. V. 36, red hair. VI. 21 to 26, none albinotic. VII. 1 and 2, abroad, no information. V. 38, iris blue; hair light brown formerly very fair, nicknamed "mousy." V. 39, single. V. 40, died young. V. 46 to 48, all dark. VI. 29, dark. V. 50 to 53, not fair, nor dark. V. 54 and 55, none fair, all single. IV. 35 to 43, all blue eyes, except IV. 40, dark. IV. 41, fair, dead. IV. 42, all died in infancy. V. 56, fair; eyes blue; VI. 30 and 31, hair medium shade brown. V. 57 to 77, all fair with blue eyes except three (V. 60, 69 and 70). V. 65 to 67, triplets, dead. V. 77, still-born, order in sibship unknown. V. 57, illegitimate, has two living children (VI. 35 and 37) in a sibship of six. Particulars of this sibship have kindly been obtained by Major F. M. Mangin through Mr Nettleship. VI. 35, age 6½, hair, brows and lashes flaxen yellow; iris hazel grey, not translucent, pupil black; no nystagmus; skin blisters in the sun; refraction R. H. simple astigmatism, $V. = \frac{6}{18}$; L. my. astigmatism, $V. = \frac{6}{60}$; fundi, somewhat light in colour, are normal. VI. 37, age two, eyes dark; hair mid-brown. VI. 32, as fair as VI. 35. VI. 33, fair. VI. 34, quite fair, died in infancy. VI. 36, quite fair. VI. 38, fair; eyes blue. VI. 39 and 40, both dark. V. 78 and 79, all fair; eyes blue. V. 80, others, died in infancy. V. 81, dark. V. 82, both fair; eyes blue. V. 83, fair; eyes blue. V. 84, dark. V. 85, died in infancy. V. 86 and 87, all fair; eyes blue. V. 88 to 92 all fair with blue eyes. (C. H. Usher, February, 1910.)

Fig. P. One case of albinism of the eyes in a sibship of thirteen. V. 21, boy (J. W.), age 6 (1910), seen, hair, lashes and brows yellow-brown not very light; skin not markedly blond; iris blue, no pigment in stroma; pupil shows red reflex; constant lateral nystagmus, rate 130 per minute; fundus albinotic; optic disk darker than rest of fundus; choroidal vessels conspicuous except at macula. The child was also seen when 19 months old, had been in Aberdeen Royal Infirmary for "rupture," condition then:—hair fair; iris blue; constant lateral nystagmus ("born with it"); movements of eyes full; pupils equal, contract to light, "sees well"; refraction tested after mydriatic R. H. 4 D. in vertical meridian, 7 D. in horizontal meridian; L. H. 4 D. in vertical meridian, 7 D. in horizontal meridian; choroid lightly pigmented. Although correcting lenses have been worn constantly from that time to this the nystagmus has persisted. V. 12, 14, 17 and 20, were miscarriages or still-births, all other siblings in this sibship, V. 12 to 23, have blue iris and pale fundus though no fundus quite so pale as V. 21. V. 13, is only one with any pigment in stroma (V. 15, not seen). Mother (IV. 63), iris blue, no pigment of stroma; fundus not pale. Father (IV. 22), iris blue, a few brown spots in stroma (perhaps three or four on each iris), fundus not albinotic. The four grandparents (III. 17, 30, 38 and 45) had blue eyes. III. 38, had brown hair and a red beard, and was fairest of the family. III. 30, had fair hair. Great-grandmother (II. 9), fair; eyes blue; died at 90, her husband (II. 3), was "not dark." II. 12, fair and eyes blue; had "crossed eyes." II. 12 a, 12 b and 12 c, had "crossed eyes." III. 33 a, "crossed eye." IV. 20, one of his eyes slightly "off the straight." II. 13, half brother of II. 14 and 15. II. 11, vision good, ob. 109, probably dark. II. 15, fair. II. 17, dark and brown eyes. II. 18, dark, eyes grey. II. 19, dark. No case of albinism is known in the pedigree. There is no information as regards III. 34, VI. 21, VI. 20, infant and V. 94, and one of IV. 19, who died young. V. 86, are several who died in infancy. Red hair occurs in III. 36, IV. 9 and VI. 3, yellow hair in IV. 14, 16, 45, 49. Three of IV. 73, V. 24 and all of VI. 1, died of phthisis. Twins

occur three times, V. 7 and 8, V. 69 and 70 and V. 73 and 74. Marked prevalence of blondism in the direct ancestry. (C. H. Usher, January 18, 1910.)

Fig. Q. One albino in a sibship of two. V. 8, female (M. D.), seen, age 4 (1911); hair, lashes and brows light yellow—brows lightest; skin blond; some freckles on brow and bridge of nose; iris blue; constant lateral nystagmus “since birth”; involuntary lateral movements of head; red reflex in pupil; media clear; pale fundus; no pigment at optic disc; choroidal vessels conspicuous except at yellow spot; refraction R. H. 7 D. in vertical meridian, 8 D. in horizontal meridian; L. H. 7 D. in vertical meridian and 9 D. in horizontal meridian; child is excitable; blood gave a quite negative Wassermann reaction (tested by Dr A. W. Falconer). Mother (IV. 39), brown hair, iris blue, marked exophthalmic goitre, noticed first just after V. 8 was born. Father (IV. 7), fair brown hair, iris blue. III. 18, dark hair, blue eyes. III. 17, only child, red hair, blue eyes. II. 8 and 9, both dark hair and blue eyes. II. 6 and 7, both dark. I. 1, red hair. II. 12, died young, silly. II. 10 and 11, both dark with blue eyes; their father died of erysipelas after amputation of leg, and mother died young of fever, but no particulars of hair or eye colour (not in chart). I. 3, married twice, no particulars of her or her husbands, I. 2 and I. 4. IV. 5, very fair, eyes blue. IV. 2, hair dark, eyes hazel. III. 1, hair dark, eyes hazel, married, no offspring. II. 1 and 2, not albinotic. V. 9, hair dark, blue eyes. III. 30, in asylum. III. 29, died young, “meningitis.” III. 27 to 30, all dark and blue eyes. III. 28, all died young (1) of “diabetes,” (2) “dropped down,” (3) “meningitis.” II. 13, dark, eyes blue. III. 31 and 32, all dark. IV. 57, no particulars. III. 19 to 26, all dark with blue eyes. IV. 40, fair, eyes blue. IV. 41, auburn, eyes blue. IV. 42 to 44, dark, and eyes blue. IV. 45 and 46, dark, and dark blue eyes. IV. 47 to 56, dark, two with blue eyes (? which). IV. 51, died in infancy. IV. 52, two with blue eyes. III. 9, red hair. IV. 8 to 11, “all red hair and blue eyes.” V. 10 and 11, families, but no particulars. III. 10, red hair, blue eyes. IV. 12, dark. IV. 13 to 16, fair. V. 12, very fair, blue eyes. III. 12, dark hair and eyes. IV. 17 to 23, family of fifteen. IV. 23, died young. IV. 21 and 22, twins, one fair and one dark. IV. 17 to 20, all dark and all have blue eyes except two females (? which). V. 13 and 14, dark hair and eyes. V. 15 and 16, dark, eyes blue. III. 13, dark hair and eyes. IV. 24 to 26, one fair, two dark, dark eyes. III. 14, fair; blue eyes. IV. 27 to 31, all fair with blue eyes. V. 17, infant, no information. V. 18, dark; eyes blue. V. 19 and 20, no information as to hair and eyes. III. 15, dark hair and eyes. IV. 32 to 34, fair. IV. 35, dark. III. 16, fair; eyes blue. IV. 36 and 37, fair. IV. 38, dark. IV. 1, very fair; eyes blue. V. 1 and 2, all fair; good eyesight. IV. 2, dark; eyes hazel. V. 3 and 4, dark; eyes blue. IV. 3, fair; eyes blue. V. 5, red hair and blue eyes. IV. 4, auburn hair; blue eyes, unmarried. V. 6 and 7, dark; eyes brown. IV. 6, dark; hazel eyes; unmarried. III. 4, 7 and 8, dark; eyes hazel. III. 3 and 6, dark; eyes blue. III. 5, fair; eyes blue. III. 2, hair dark; eyes hazel. III. 11, very fair; blue eyes. Nearly all in the four families, IV. a, b, c and d, were dark with dark eyes; a few were fair, but not albinos. II. 4, very fair. II. 5, dark; eyes dark. (C. H. Usher, January 30, 1911.)

Fig. R. Two albinos in a sibship of eleven from a stock with a considerable amount of phthisis. The maternal grandparents, I. 1 and 2, were normal, I. 1 being from the Highlands of Scotland. The maternal grandmother by a second husband, I. 3, had 11 children. Of the children by her first husband, the son, II. 12, is colour blind. His hair was fair when a child, but has darkened, he has six normal children, III. 23. The daughter, II. 11, age 39, has blue eyes and red-brown hair. She married P. K., II. 10, now age 45, he has blue eyes, brown hair, yellow moustache, and was fair when a child. His eldest brother, II. 1, is married and has had two children, the elder of whom is “asthmatic” and the younger died of “bowel complaint.” The second brother has married twice; by his first wife, II. 3, he has had two sons, III. 3 and III. 4, the second of whom is “asthmatic,” aged 32, and has four young children, IV. 1—4, the eldest 9 years of age. By the second wife, II. 5, II. 4 has six children, III. 6—8, none albinotic. The father, II. 10, had a sister, II. 6, who died of phthisis two years ago, she married and had eight children, III. 9—10, of whom five, III. 9, are already dead of phthisis. II. 8, the remaining brother of P. K., died of a “pulmonary complaint” leaving two non-albinotic children. Turning now to the albinotic sibship, III. 12 to III. 22, itself: III. 12 and 17 died as children, no record; III. 13 is a normal girl; III. 14, a girl, has blue eyes and yellow-red hair; III. 15, a boy, died aged 7 of tubercular meningitis; III. 16, a boy, died of “pneumonia” after measles; III. 18, is a girl with blue eyes and yellow hair; III. 19, is the living albino boy, aged 8, he is described as a complete albino; III. 20, is a girl with blue eyes and yellow hair; III. 21, is the second albino boy, who died aged 2 years of tubercular enteritis and meningitis; III. 22, is an infant in arms, sex unstated, and eyes apparently dark, but colour not yet fixed. (Dr W. J. Rutherford.)

Fig. S. One albino in a sibship of seven. IV. 9, male (J. D.), seen, age 12 (1911); hair, lashes and brows pale yellow-brown, lashes paler than hair of head; skin blond, no freckles; iris blue, constant lateral nystagmus “always”; keeps head tilted towards right shoulder and chin turned to the left, involuntary lateral head-movements; somewhat deaf; slight photophobia, no squint, red reflex in pupil, media clear, fundus pale, choroidal vessels conspicuous except at yellow spot; refraction R. H. 6 D. in vertical meridian and 7 D. in horizontal meridian, V. with correction = $\frac{6}{38}$ partly; L. refraction same as right, V. with correction = $\frac{6}{38}$. A keen, intelligent boy, fond of reading. Mother, III. 14, seen, brown

hair, brows and lashes, iris brown, pupil black, no nystagmus, fundus quite well pigmented, refraction estimated H. about 3 D. Father, III. 3, dark brown hair, iris brownish, "sight good." II. 1, not specially fair. II. 2, dark hair and eyes. II. 9, hair fair, eyes very dark, nearly black. II. 15, seen, irides blue with some dark pigment, lashes dark brown, hair now grey, previously very fair, fundus quite well pigmented, some choroidal vessels exposed. I. 1, 2, no details. I. 3, blue eyes, very fair hair, saw well. I. 4, blue eyes, medium brown hair. I. 5, black hair, dark brown eyes. II. 3, 5, 6, 7, blue eyes, dark hair. II. 10, 11, 12, 13, 14, fair hair, blue eyes, good sight. III. 1, dark hair and eyes. III. 2, brown hair, blue eyes. III. 4, 5, 6, dark hair and blue eyes. III. 7, 8, very dark hair, blue eyes. III. 9, 10, dark hair and eyes. III. 11, 17, 21, 23, dark hair and eyes. III. 19, 22, 26, fair hair, blue eyes. III. 12, 16, fair hair, dark eyes. III. 24, very dark hair, died at 3 weeks. III. 25, very fair, yellowish hair, eyes "not blue." III. 27, 28, all very fair, yellow-haired. III. 29, 30, 31, eyes not blue, dark hair. IV. 1, 2, medium hair. IV. 3, very fair, iris blue, pupils "not red," no nystagmus. IV. 5, blue eyes, fair hair. IV. 4 and 6, medium hair. IV. 7, hair very fair, died at 4 days. IV. 10, hair and eyes dark, died of diphtheria, age 4. IV. 11, hair fair, blue eyes, died at 3 months, convulsions. IV. 12, dark hair and eyes, ob. diphtheria. IV. 14, mostly dark hair and eyes. IV. 15, 16, fair hair, blue eyes. IV. 17, some fair, some dark. IV. 19, 20, very fair, blue eyes. IV. 21, all dark hair and eyes. IV. 22, 23, 24, very fair. IV. 25, dark. IV. 26, very dark. IV. 27, fair. IV. 28, uncertain. IV. 29, died at 8 months, very fair hair and blue eyes, pupils "not red," no nystagmus. IV. 30, seen (age 6, 1911), iris greenish brown, hair pale brown, also lashes and brows, fundus not well seen, child restless, parts seen were light-coloured, not albinotic. IV. 31, no details. III. 13, 15, 18, 20 and IV. 13, 18 were miscarriages. (Dr W. C. Souter, January 30, 1911.)

Fig. T. One complete albino in a sibship of four. IV. 21 (C. H.), male, age 5 (1911), seen; hair, lashes and brows nearly white, but faint tinge of yellow; skin blond, not freckled; constant lateral nystagmus; iris blue; pupils red; partial ptosis of left only, upward movement of eye-balls full; fundi very pale, choroidal vessels visible at macula though less clearly than elsewhere, no pigment at edge of optic disc; refraction: R. H. 4 D. in vertical meridian and 5 D. in horizontal meridian; L. H. 4 D. no astigmatism. He is strong; no illness except measles. Mother, III. 11, hair dark brown, iris blue; is a second cousin of her husband, III. 6. Father, III. 6, hair auburn, moustache red-yellow, left iris brown, right iris blue, fundus not albinotic. II. 10, dark hair, blue eyes. II. 9, dark hair, blue eyes. II. 2, hair brown, eyes blue-green. II. 1, hair brown, eyes blue-green. I. 1, dark. I. 2 and 3, sisters, no particulars of hair and eyes. I. 4 and 5, have same name and are distantly related, neither an albino. IV. 19, hair brown, iris blue, some yellow stroma pigment. IV. 20, hair brown, iris green-blue, some stroma pigment. IV. 22, hair brown, iris blue. III. 9, dark hair, died of phthisis. III. 10, hair dark, eyes dark blue. III. 12 and 13, dark hair, blue eyes. III. 14, single, hair light brown, eyes dark blue. III. 15, dark hair, brown eyes. III. 16, hair dark brown. IV. 25, one dark, other "dark reddish fair." IV. 26, dark, eyes dark blue. IV. 23 and 24, all dark. III. 1 and 2, both dark, eyes blue. III. 3, very fair, married, no offspring, hair formerly very fair, darker now, eyes blue. III. 4, hair brown, died of phthisis. III. 5, brown hair, eyes blue. IV. 1, both fair, eyes blue. IV. 2, dead. IV. 3 and 4, hair brown, eyes brown. IV. 5, hair yellowish, eyes brown. IV. 6, dark, eyes blue. IV. 7 and 8, hair brown, eyes blue. IV. 9, brown hair and eyes. IV. 10, hair dark, eyes blue. IV. 11, hair light red; eyes light blue. IV. 12 and 13, both dark; eyes blue. IV. 14, died young, not albino. IV. 15 to 18, all blue eyes, hair light when young, darker later. III. 7 and 8, all dark. III. 17 to 20, all dark. III. 18 and 19, died of phthisis. III. 21, not albinotic. II. 11 to 16, all dark. II. 12, 13, 14 and 15, died of phthisis. II. 3, hair brown, no offspring. II. 4, hair darker brown. II. 5, very fair, eyes blue. II. 6, fair. (C. H. Usher, March 9, 1911.)

Fig. U. This is a family history showing the association of partial albinism with general degeneracy. Of Generation I. there is no information. Of the sister and brother, II. 1 and II. 2, II. 1 is alive, aged 74, and has been many years in an asylum. II. 2 died of paralysis, aged 72. He had married into a family of whom II. 3, II. 4 and II. 5 are still alive at ages 80, 78 and 76 respectively. His wife, II. 7, died of cancer at 60; II. 6 and II. 9 both died of phthisis, aged 40 and 24 respectively. Of the third and fourth families, II. 10 died at 79, II. 11 at 45, II. 13 at 78, causes unknown. II. 12, the maternal grandfather of the partial albino siblings, died from "heart" at 75. The maternal grandmother, II. 19, died of "tumour," age unstated, but her siblings, II. 14, 15, 16, 17, lived to 90, 87, 72 and 70 respectively, and her brother, II. 18, is alive at 72. The father, III. 2, aged 46, has a white lock or "flare." Of his siblings III. 1, III. 3, III. 4, III. 5 and III. 6 are alive at ages 49, 45, 43, 40 and 38, while III. 7 died of pneumonia at 22. These siblings have not been individually investigated, but III. 2 reports them in fair health and says that they have no white lock. III. 12, the mother, aged 42, suffers from rheumatism and is mentally "rather simple." Of her siblings, III. 9, III. 10 and III. 13 are alive at ages 51, 49 and 40 respectively; III. 8 died of stroke at 53; the twins, III. 14 and 15, died at 4 years, and III. 16 of convulsions at 11 months. The offspring of III. 2 and III. 12 appear all more or less defective. IV. 1, 2 and 3 have definitely white locks or flares. IV. 4 is said by her father, III. 2, to have it, but her mother, III. 12, was doubtful. IV. 1, died of convulsions. IV. 2, is deaf and in an imbecile asylum. IV. 3, is mentally defective. (Facts provided by Dr D. W. Hunter.)

Fig. V. Three Solomon Island albinos¹ in the same sibship. II. 1, hair pure white; brows and eyelashes, also beard, pure white; complexion of face very fair and he is spotted with large freckles. From the neck to his feet he is about the colour of a Samoan with a clear-skinned body, while his arms and legs are spotted with large black spots; "his eyes as near as I can describe them are a light blue with a white pupil, he cannot see very distinctly during the day, but I am told his sight is very good at night, he has the distinction of being able to wander around in the bush on the darkest nights and climbing trees for the purpose of looting birds' nests"; nystagmus, vision defective; otherwise physically robust. II. 2 and II. 3, "the two feminine albinos I do not know anything about on account of their being so very shy of white people." Father (I. 1) and mother (I. 2) are absolutely black and no distinction can be found between them and the average Solomon Islander. Nothing known as to grandparents. Pupil said not to be red, but this is of course only statement of lay observer, there is clearly no marked red reflex.

Plate LVII. Pedigree of Albino Dogs. Pekinese Spaniels. See Part II. Chapter XI. Section III.

Plate LVIII. Fig. W. Fifteen complete albinos in four generations and three piebalds in one of the sibships. I. 2 (Sehephehephe), by his first wife (I. 1) had four children (II. 2—5) and by his second wife (I. 3) three children (II. 6—8). II. 1 (Moshesh), the great chief, married II. 2 as his chief wife; about 80 years ago he amalgamated a conglomerate of Bantu tribes from remnants left by Zulu and other raids; the chief tribe was that of the Batukeng (*i.e.* the people of the dew); he was a minor chief in the tribe of the Bakoenā (*i.e.* people of the crocodile). II. 2 (Mamohato), one of the Batukeng, who can trace their descent back for 200 years. This tribe have the brains of Basutoland and they are virtually ruling Basutoland. IV. 2 (Jonathan), is the big chief at Leribe and is practically the native ruler of Basutoland, as his nephew the paramount chief is a weakling. V. 3, albino, dead. VI. 1, albino boy, died 1911, age 4, from gastro-enteritis. III. 4, was married to III. 3, by whom he had three male children (IV. 1—3), as well as to III. 14, by whom he had a male child (IV. 4). V. 4, 5 and 6 are piebald. Three photographs of V. 5 indicate that there is no light skin on forehead and that hair of head is dark; his eyes are dark, no photophobia; anteriorly left side of chest is pale, the pale area is continued in front of neck and along flexor surfaces of left arm and forearm, to the fingers and extensor surface of forearm; the pale skin is sharply defined from the dark skin; on front of chest the line of junction of dark and pale skin encroaches slightly on right side of chest; extensor surface of left arm, whole of right arm, forearm and whole of back is dark except a large pale patch at upper part of left side of back continuous with pale area on chest in front; legs not visible as he is clothed below the waist. See *Atlas*, Part II. Plate 7 (1)—(3).

Dr Macfarlane states that he has not given a complete family tree as there are many wives and numerous children, but he has given the albino strain. He also says that in the branch of the family through the woman Mamohato (II. 2) there are only two albinos (V. 3 and VI. 1), but it is remarked by the Basuto that three-fourths of the descendants are snuff-coloured with the black pigment in small spots mostly in face and arms. These black spots are fairly thick and give them a peculiar appearance. It is most marked in this branch of the family, but is fairly prevalent in the other branches. The following names are attached: I. 2, Sehephehephe. II. 1, Moshesh. II. 2, Mamohato. II. 3, Mohao. II. 4, Rankhetar. II. 5, Matete. II. 6, Malebulu. II. 7, Ramapepe. II. 8, Nkhase. III. 1, Mantsie. III. 2, Letsie. III. 3, Mamuso. III. 4, Molapo. III. 5, Masupho. III. 6, Maxa. III. 7, Luta. III. 8, Makhoe. III. 9, Lethloenya. III. 10, Ntoneng. III. 11, Sethes. III. 12, Abel. III. 14, Chakale. III. 15, Maputse, and III. 16, Makutse were both albinos and never married. III. 17, Maditsojane. III. 18, Rabogha. III. 19, Masakale. III. 20, Lehana. III. 21, Mokeka. III. 22, Mposso. III. 23, Motobe. III. 24, Mamartine, and III. 25, Deborah are both albinos. III. 26, Selloane. III. 27, Mashedi. III. 28, Levi. IV. 1, Joseph. IV. 2, Jonathan. IV. 3, Jael. IV. 4, Khethisa. IV. 5, Lesojane, and IV. 6, Rantoane, both albinos. IV. 7, Enoch. IV. 8, Elisha. IV. 9, Sethes. IV. 10, Paulus. IV. 11, Eliaba. IV. 12, Kokobela. IV. 13 and 14, both albinos. IV. 15, albino. V. 1, Motsarapane. V. 2, Majoel. V. 7, 8, 9 and 10, albinos, not named. VI. 1, Joel. There is no information as to the mates who were presumably normal but may well have been more or less consanguineous, although marriage within actual stock would have been recorded. The names may serve for identification in any future extension of the pedigree. (Dr N. M. Macfarlane's case, January 15, 1912.)

Fig. X. A most interesting family of Negro Piebalds, the Anderson family, from Louisiana. Very inaccurate and divergent accounts have been published of this family, and the reason of this has been made clear. The accounts have been drawn from members of the family on tour, and with shows, and in such circumstances they are often marvellously described. Thus III. 1 and her sons, IV. 1 and IV. 2, when seen with a circus in Washington State were described as "— Islanders," *i.e.* from some distant savage island. When III. 1 was taxed with this she replied: "We are from any place or of any people that the manager thinks best." This will account for the difficulty in identifying "The Leopard Family" and for the erroneous statements made to Maass (1896) and Baudouin (1905) by "The Three Graces" on tour, when inquiries were made as to their family history: see our Appendix, Pedigree Fig. 509. Some-

¹ The description of Fig. V. is from a letter by Mr J. Schröder, in whose employ II. 1 had been, to Captain John Palmer (Brisbane) who had kindly made inquiries regarding this family.

what more reliable family histories were given to Ettore Levi (*Albinismo parziale eredo-famigliare in negri della Luisiana*, *Archivio per l'Antropologia e l'Etnologia*, Vol. xxxix. pp. 5—13, Firenze, 1909), and to F. Frassetto (*Casi di Albinismo parziale ereditario nella famiglia Anderson della Luisiana* (S. V. d'A.), *Atti della Società Romana di Antropologia*, Vol. xv. Fasc. II. pp. 155—171, Roma, 1910). The most complete account, however, hitherto published, is that of Q. I. Simpson and W. E. Castle (*A Family of Spotted Negroes*, *The American Naturalist*, Vol. xvii. pp. 50—56, New York, 1913). The account of the latter authors differs in some important respects from those of the two Italians, and these differ from each other. By the courtesy of the Editor of *The American Naturalist* and of Messrs Simpson and Castle, we have been able to reproduce photographs of III. 1 and her three children, IV. 1, 2 and 4: see Plate π , *Atlas*, Part II. We have already published "The Three Striped Graces"—who are supposed to be III. 14, 15 and 17, but their exact identification is not certain (see Plate VV. (158) and Fig. 509)—and "The Leopard Family," probably of the same stock (see Plate XX (165) and pp. 203, 242 and 249). The "Three Striped Graces" are said to be Mary, Rose and Fanny Anderson, these correspond to the Marie, Rosa and Fannie of Simpson and Castle, but Frassetto calls "Les trois Graces tigrées" Sadie, Fannie and Rose, which replaces Marie by Sadie, *i.e.* III. 14 by III. 21, and he further gives Marie a white man as husband, but no children. There is no mention in Simpson and Castle's version of Marie being married or of any children of hers. According to Levi three sisters were performing in a theatre of varieties in Florence, and he gives a rather badly reproduced photograph, of what we presume to be "The Three Striped Graces," but now—according to his pedigree—they are Eliza (III. 1), and Rosy and Fanny, he gives separate photographs of Rosy and Fanny, but not of Eliza. He says that Eliza has three children. Thus Marie and Sadie are not included in his "Three Graces." He calls them in his pedigree Mary and Sady, but does not give a husband to either of them. Rather poor photographs of II. 1 and 2, Simon and Lettice Anderson, are given, and one of Beatrice Anderson, IV. 14, and her normal Aunt Hattie, III. 22. Levi's reproductions are not good enough to enable us to identify his individual piebalds with our "Three Graces," and we are compelled to assert either that the "Three Graces" have been at different times different members of the family—which is quite possible—or that there has been considerable confusion in the data provided or the record of it. Frassetto got his facts from Beatrice and Hattie, Ettore Levi from "The Three Graces," and Simpson and Castle principally from Eliza and from letters from Simon. Frassetto gives poor portraits of Simon and Lettice (II. 1 and 2), of "Les trois Graces tigrées," of Eliza and her three children (III. 1 and IV. 1, 2, and 4), and of Beatrice (IV. 14), at ages 9, 12 and 15. He does not provide the real order of birth. His account differs in one essential particular from that of Levi and of Simpson and Castle; he makes the father of II. 2 unknown, but her mother a piebald. We owe to the courtesy of Mr Simpson the statement that II. 1 had written to him saying that his wife's parents, I. 1 and 2, were both dark and that there were eight dark brothers and sisters to his wife. Mr Simpson, however, says that II. 1 writes poorly and the normality of I. 2 may, perhaps, be considered as not absolutely certain. II. 1 also says that he had nine spotted and six normal children; the nine spotted being three boys and six girls. His daughter, Eliza, says that there were only five spotted girls, and this agrees with the family as given by Frassetto and Levi, except that the former gives two additional normal sons *without names*. We have as a rule followed Simpson and Castle, who preferred Eliza's to Simon's statement, but Frassetto may have heard of two normal sons dying in childhood. Levi gives only five piebalds in our Generation IV., Frassetto gives the sexes of five piebalds and three mulattoes, Simpson and Castle give only the sex of IV. 1—4 and 14. Frassetto makes the mother of Beatrice, III. 11, a mulatto, and IV. 15 and 16 he calls mulattoes, he does not make the latter a piebald. He does not mention any children of III. 3, III. 8 or III. 12. Simpson and Frassetto's "Horace" is Levi's "Harris" and our III. 6; only Simpson and Castle record his second marriage. Frassetto's "Shad" (?) must be Levi's "Luigia" and Simpson's "Eugenia," our III. 3. Simpson's "Bennie," our III. 19, must be the "Binny" of Levi, and we suppose the "Tom" of Frassetto, although we do not know why this piebald becomes "Tom"! The above remarks are not written in any captious spirit, but merely to indicate how three persons all anxious to get a full pedigree may diverge very considerably in recording details received from different elements of one family.

I. 1, unknown according to Frassetto, normal according to Simpson. II. 2, piebald according to Frassetto, normal according to Simpson. II. 1, Simon A., aged upwards of 73, medium dark¹, entirely normal in appearance. II. 2, Lettice A., coloured part of skin medium dark, no change with age and the same is asserted of other piebalds in the family; photographs of Frassetto and Levi show that her face and hands are mottled and that she almost certainly has the "flare"—no other details visible or describable. Simpson and Castle say her parents were both "normally coloured negroes" and call her a "mutant." The pair were married in 1868 and have had fifteen children, eight spotted like the mother and seven normal, and of these normals Simpson and Castle say that they vary "in depth of pigmentation as is usual in mulatto families," and again the pigmentation of spotted children "...likewise varies in intensity from light mulatto to coal black. The white spots are, however, in all cases entirely devoid of pigment" (*American Naturalist*, p. 53). If these statements be correct then either II. 1 was not a normal negro, or

¹ Thus Simpson and Castle, but Levi says "colorito brunissimo."

I. 1 and I. 2 were one or both not normal negroes and a hybridisation occurred in the ancestry of II. 1 or II. 2, we suspect in the ancestry of II. 2¹. If this be true, it confirms the view several times expressed in this monograph that the appearance of piebaldism is associated with, not a parental, but an ancestral crossing of races.

The chief characteristics are the "flare" on forehead and the white comb, a dorsal black stripe and either a clear or only mottled chest. See Plates VV and π . As a rule the upper arms are mottled, but the lower arm and hand, or the hand only, may be "gloved."

III. 1, Eliza D., piebald, married a mulatto, III. 2, and they have offspring: IV. 1, piebald, dead; IV. 2, Jim D., piebald, dark colour; IV. 3, Robert D., skewbald mulatto or light colour; IV. 4, Lillie, medium pigment, piebald. III. 1 and IV. 2, 3, 4 are given on Plate π (1)–(4). III. 3, Eugenia A., normal, married a normal negro, III. 4, and has two normal children, IV. 5 and 6. III. 6, Horace A., piebald, has married twice, first III. 5, a mulatto woman, and then III. 7, a normal negress. By III. 5 he had three children: a male mulatto normal, a "light brown," IV. 7; a female brown skewbald, IV. 8; and another brown skewbald, sex not stated, IV. 9. By III. 7 he has one child, sex not stated, a piebald, black pigment. III. 8, Jake A., normal male, married a coloured wife, III. 9, and has three coloured normal offspring, IV. 11–13, sex not stated. III. 10, John A., piebald, married a coloured woman (Frassetto says she was a mulatto), III. 11, and has had three children: IV. 14, piebald, Beatrice, born February 4, 1892. When seen by Frassetto she was aged $15\frac{2}{12}$, appeared of sound constitution "with a melancholy countenance of little intelligence." This seems to contradict Levi's own photograph of her, which shows rather a bright youthful face. In April, 1907, according to Frassetto, IV. 14 could hardly read or write and had been for some years an acrobatic dancer under the name of "The Tiger Lily." He gives certain measurements and a very full description of her colour and the distribution of spots to the waist. The colour of her face was that of a dry tobacco leaf, the thorax and arms were of a blended tint, from greenish yellow to chocolate. The least coloration was noticed in a zone which crossed the face from one zygomatic region to the other, and on the hands; the greatest coloration was on the neck and dorsal region of the trunk. The iris was of dark chestnut. The comb was snow-white, as woolly and curly as the dark portion, but the hairs finer and shorter. Two tufts of a few dark locks occurred in the white comb situated on two small pigmented areas of the scalp. The eyebrows have their hair smooth and straight, and in the middle region of each white is predominant, adjacent we have a region of mixed white and black, the hairs becoming entirely black towards the extremities. The eyelashes were neither long nor thick, the five middle hairs on the upper eyelash of the left eye were white, all others black.

Returning to the offspring of III. 10, IV. 15 was a normal girl and IV. 16 a boy, piebald according to Simpson and Castle, whom we have followed as to skin, and normal according to Frassetto. III. 12, Jane A., married a normal negro, she was normal and has two normal children. The remaining normal members of Generation III. are III. 16, Adolphus A.; III. 18, Maggie A.; III. 20, Louis A.; and III. 22, Hattie A. Very little appears known as to these normals. Hattie, the only other member of the family seen by Frassetto, was then said to be aged 15, as young as her niece Beatrice; she was an acrobatic dancer, and Levi gives a photograph of her alongside Beatrice, she appears considerably older than the latter. Some inquiry as to these normals, an investigation, if possible, of their entire bodies and an examination of their children, if they have any, would be of much value. They are presumed to be at home with their parents, but it is clear that isolated spots on the lower parts of the body would have no value for show purposes and might easily escape notice or record.

III. 14, Marie, piebald; III. 15, Rosa, piebald; III. 17, Fannie, piebald; and III. 21, Sadie, piebald; are the four sisters, three of whom are assumed to be the present "Three Striped Graces." Frassetto makes Sadie one of them, Levi replaces her by Eliza, III. 1, and Maass gives Rosie, Marie and Fannie. Eliza is certainly not the third Grace of our Plate VV. She does not look like the third Grace of Levi's own photograph of them, her comb is quite differently shaped. Frassetto says that Marie has married a white man and has no offspring. Levi gives separate portraits of "Fanny" and "Rosy," it is impossible owing to the pigment patch on the chin to identify either of these with the figure on the left of our Plate VV (158), which has no patch on the chin. Neither do Levi's portraits of "Fanny" and "Rosy" agree with our central figure. The right-hand figure might possibly be Fanny. Levi's details of these sisters are not sufficient to replace the obscurities of very badly reproduced photographs. Of Marie we have no photograph from either Levi or Frassetto. Possibly then our three are Fanny, Sadie and Marie. Of III. 19, Bennie, we have no account at all. According to Simpson and Castle, in 1913 Marie was in America, while Rosa, Fannie and Sadie were in Europe. But Rosa does not, to judge by Levi's photograph, appear to be one of our "Three Graces." We think it would be desirable to have further details as to the present whereabouts of Bennie, and also some account of which members of the family have from time to time been exhibited as "The Striped Graces."

¹ While the poor photograph referred to shows several marked negro features, the high forehead of Lettice A. seems to suggest some European blood.

Fig. Y. Piebald from British Honduras. This is another of the remarkable list of cases in which a hybrid from races of different colour, when mated with one of the pure original stock will give birth to a piebald. The case was first noticed by the Comte de Périgny, who brought back photographs of the piebald boy to Europe, and provided M. le Professeur R. Blanchard with the data for his paper in the *Bulletin de la Société française d'Histoire de la Médecine*, t. ix. p. 213, Paris, 1910. Our illustrations on Plate $\beta\beta$ are from photographs most kindly given to K. Pearson by the Comte de Périgny. The case is of extraordinary interest, as the piebald boy is exactly of the "classical type" exhibited in paintings of the seventeenth century, and doubts had been cast on the very existence of such cases. In the present case the father, III. 2, of the boy, IV. 3, was a pure coal-black negro, with parents, II. 1 and 2, and brothers and sisters, III. 1, like himself. The mother, III. 3, is a mixture of negro and Spanish Indian blood, one parent, II. 3, being a negro and the other, II. 4, a mestiza or cross between Spanish and Indian blood, but as II. 4 is said to have had one negro grandmother, either I. 3 was a mulatto or I. 4 only half Indian. III. 3, has a relatively fair skin and in local parlance is called "clear"; black eyes and long black hair, and her brothers and sisters, III. 4, are fair-skinned like her. There are six children of the marriage; the three eldest are boys, IV. 1, aged 11, IV. 2, aged 9, and IV. 3, the piebald, aged $7\frac{1}{2}$; the three youngest are girls, IV. 4, aged 4 years; IV. 5, 2 years; and IV. 6, 9 months. The father and mother and the last three children together with the piebald are given on Plate $\epsilon\epsilon$. The photograph indicates not only the difference in colour between father and mother, but the range of colour in the three daughters. The following remarks are taken from *Biometrika*, Vol. ix. p. 331, where Pearson has given an account of this piebald:

"As soon as I had seen M. Blanchard's account of this piebald boy I wrote to the District Commissioner at El Cayo, Mr R. H. Franklin, and he most kindly sent me the fuller particulars here given, as well as arranged to have the family photographed for me¹. He tells me that the youngster ('Lisbey') is the pet of the place as well as its curiosity, and that he is quite an intelligent boy. He was born on December 1, 1904, at Peten in Guatemala, and the reason his parents give for his piebaldism is 'that owing to an eclipse of the moon on the night of his birth, he caught it in the head and it scattered over his body.' There was no eclipse of the moon on that date nor any near it. One further point may be emphasised with regard to this boy. In our monograph on Albinism, p. 248. Plate I (23)—(26) we deal with the case of a piebald boy from Papua, and we give photographs taken at nine years' interval. The dark patches have grown larger, but they have not increased in number or relative size. In the present case a careful comparison of the dark patches on the legs and arms of this Honduras piebald boy in the recent photographs of July, 1912, and those of the Comte de Périgny of some four years earlier, shows with almost absolute certainty that the relative area of dark pigmentation has considerably increased. This remarkable fact renders the boy of special interest, and it is to be hoped that in still later years photographs of him may be obtainable for comparison with the present series."

Fig. Z. Red Hair and Albinism. Two red-haired persons, I. 1 and 2, married; they had four children, the eldest red-haired. II. 2, married a blond woman, II. 1, and had a blond son, III. 1, and an albino daughter, III. 2. Some of the red hairs of II. 2 show, when microscopically examined, very pale yellow diffused pigment, others a deeper yellow in which there are a decided number (γ) of very small granules, fewer in the paler yellow hairs. The second child, a daughter, II. 3, had brown hair; the third child, II. 4, was an albino, who married a man, II. 5, with brown hair, and they had two children, a son and daughter, III. 3 and 4, both with brown hair. The fourth child, II. 6, of I. 1 and 2, has brown hair; he married a woman with black hair, II. 7, and their offspring consists of two red-haired boys, III. 5 and 6. The red hair of III. 5, on microscopical examination, shows bright yellow diffused pigment with plenty (δ) of very small granules. This pedigree illustrates the close connection of red hair with albinism and the difficulty of treating red hair as a Mendelian unit character. (Case due to H. J. Laski.)

Fig. AA. An isolated case of albinism in a stock, where the parents have repeatedly inquired as to the existence of other albinos in related families, but have not been able to trace any. Our inquiries show none either. There is no consanguinity between father and mother of the albino. IV. 4 and 5, aged (March, 1912) $21\frac{0}{12}$ years and $1\frac{8}{12}$ years, are normal boys. IV. 3, is an albino girl. She has the characteristic yellow white hair; general health good; mental condition (aged 4) appears fairly good, though her teachers describe her as being "a little bit gone." Nystagmus present; fundus typically albinotic; high myopic astigmatism, my. 8 D. vertical, 4 D. horizontal in each eye. Mother, III. 10, seen, health good, hair medium-brown, eyes dark brown. Tailoress by occupation, sight good. Mother has six sisters, III. 15—20; one, III. 20, is married but without offspring, they are all normal. She has also three normal brothers, III. 11, 13 and 14. III. 11, is married and has one male child, IV. 6, fair with blue eyes. II. 27, the maternal grandmother, was dark and died of cancer; the maternal grandfather, II. 26, now living, is grey but was originally fair. The mother has two uncles, II. 28 and 29, and two aunts, II. 30 and 31, still living, on the maternal side, others, II. 32, are dead; all this family were normal; no information obtainable as to their marriages or offspring. On the mother's paternal side, there were two great aunts, II. 24 and 25, the former, unmarried, was very fair with blue eyes, the second is married and has two normal

¹ See Plate $\epsilon\epsilon$, Figs. (1) and (2) of the *Atlas*, Part II. to this monograph.

children, III. 9. There are six great uncles, II. 18—23; of these, II. 19, 21 and 23, are unmarried, II. 18, 20 and 22, have respectively five, two and two children, III. 6, 7 and 8. All these are normal, as well as the great-great-grandparents, I. 5 and 6. Of the other pair of great-great maternal grandparents there is no report. III. 5, the albino's father, is healthy, a tailor by trade, he has red hair and bears a bad character; no definite history obtainable of constitutional disease. There are two paternal uncles, III. 3 and 4, the former is married and has a dark child, IV. 2; there are two paternal aunts, III. 1 and 2, the former is married and has one child, IV. 1, a fair girl; all this sibship and its offspring are normal. II. 12, the paternal grandmother, died of apoplexy, she was dark, she had three normal brothers, II. 13—15, and two normal sisters, II. 16 and 17, there is no record of their issue. Her husband, II. 11, was also dark, and had a brother, II. 10, a normal, still living. No further information as to II. 9, other uncles and aunts on this side, could be obtained. The four paternal great-great-grandparents, I. 1—4, were all normal. The order of birth in most of the sibships was not recorded. (From Dr R. A. Askins, March 12, 1912.)

Fig. BB. Two albino girls in a sibship of five in Northern Rhodesia. I. 2, Nyatula, married a normally coloured mate, and had children: II. 2, Nachilwa and II. 4, Gondwa, and others. These two married normal mates and had respectively the son Njenjema, III. 1, and the daughter Yakintola, III. 2. These first cousins married, and so far there was no history of albinism in either parental line. The offspring are: IV. 1, normal, IV. 2, also a girl, normal, IV. 3, a normal boy, and the two albino girls, IV. 4 and 5. The family belong to the Atumbuka tribe and live at Chijerna's village, Kapichira, Lundazi. The mother, Yakintola, III. 2, is now dead. Two photographs of these sisters show the mother holding the younger, Jane, and the elder sister standing by; a man, probably father, seated in the background. Jane is about three years old, and the elder sister perhaps eight or nine. Both have their eyes shut—probably as much from photographophobia as from photophobia. Father and mother appear also to have their eyes closed. IV. 4, has a blotched right arm, neck and face, but it is not possible to say from the photograph whether these are due to blisters or to dirt.

The Native Commissioner states that the hair of head, lashes and brows in the case of Jane, IV. 5, is yellowish white, and her skin is white to pink. She has a few red blotches about the size of a shilling on shoulders and various other parts of body, all of which her relatives said were due to vermin. Eyes: iris, mother-of-pearl colour with tinge of pink, pupil red. There is photophobia, no pigment in conjunctiva, nystagmus?; there is a squint, right eye inwards. Sight appears to be normal. No deformity, well-developed, and no apparent mental defect; relatives say Jane is a healthy child. (Particulars from Dr Alexander F. Wallace.)

Fig. CC. Four albinos in a sibship of eight. II. 3, health good, labourer by occupation, brown hair and blue eyes. II. 4, health good, brown hair, hazel eyes, squint, the fifth born of eleven children. Nothing stated of the four grandparents but a denial of any albinotic history. No consanguinity in parents. II. 2, a sister of the father, is normal and has brown hair, but her children are said to have defective sight and all wear spectacles, possibly albinotic, but it has not been possible to examine them. In the albino sibship, III. 2, was a normal male who died of pneumonia at 11 months; III. 3, normal girl, aged 11, healthy, fair ability, hair brown, eyes hazel, squint, wears spectacles; III. 4, albino girl, aged 10, health good, and ability fair, white hair with yellowish tinge—microscopic examination shows no diffuse pigment and no granules—irides blue, red reflex, constant nystagmus present from birth, slight photophobia, large vessels of choroid visible over most of fundus, not in central region, uses Brail, very high hypermetropia, 12 D. horizontal, 9.5 D. vertical, with considerable astigmatism. III. 5, albino girl, aged 8; rickets, legs, chest and head; gets bronchitis, ability good; white hair with yellowish tinge; eyes blue, red reflex, slight photophobia, uses Brail, nystagmus, irides rather lighter blue than III. 4, pupils occasionally pinkish, considerable nystagmus from birth of lateral character, fundus normal; myopia 2.5 D. horizontal, 3.5 D. vertical, moderate or low myopia with slight astigmatism. III. 6, normal male and III. 7 albino male, were twins, never thrived, and died of marasmus at 4 months. III. 8, normal girl, aged 4, brown hair and grey blue eyes. III. 9, female, aged $1\frac{4}{12}$, albino, white hair, darkish blue irides, constant large lateral nystagmus from birth, pupils black, fundi normal. (Contributed by Miss E. A. Quare; eye-report by Mr W. G. Laws, Nottingham.)

Fig. DD. This is a pedigree of the H. family which has a white flare and crest, as well as occasional white patches. IV. 3, was the illegitimate child of her mother, III. 9, by III. 8, who possessed the flare and died of consumption when III. 8 was 16 months old. III. 9, afterwards married and had 12 normal children; she was jet black; there was no white lock in her family, she died of cancer of rectum. Of the siblings of III. 8, III. 1 and 2, his brothers, have no flare, III. 4, a sister, has the flare, but the number and condition of her children unknown. III. 5, another sister, had the flare and died old, unmarried. III. 7, the third sister, has the flare, and so have her children but their number is unknown. The mother of the flare sibship in III. 1, II. 2, had the flare, but no particulars are known of her parents, I. 1 and 2. IV. 8, husband of IV. 3, who has "chest complaint" and his three sisters, IV. 5, 6 and 7, are or were all normal; so were his father, III. 11, and mother, III. 12. III. 11, appears to have deserted his family before they were grown up. III. 12, died 16 years ago (1912) of uterine trouble. We have thus no definite evidence of any mental trouble on either side. The mother, IV. 3, herself is dark, she has a

well-marked flare and white lock, she has also a white patch on the abdomen; she is (February, 1913) at present suffering from abdominal swelling and pain, but declines to take medical advice—possibly from fear of an operation. Another account says she has bronchitis and dropsy. The offspring of IV. 3 and 8 consist of 13 children, of whom V. 3 and 9 died, the former at 13 months, and the latter at birth, and there is no record of the condition as to flare. Of the remaining children five have the flare and six are normal. V. 2, the eldest, a girl aged 26, is just married, but as yet has no children. V. 4 (A. H.), aged 23, is a soldier, he is dark and has a relatively small flare. V. 5 and 6 (L. H. and R. H.), aged 21 and 19 respectively, have light brown hair and are normal. V. 7 (A. H.), aged 17, is a van boy, he has red hair and a marked flare. V. 8 (A. H.), aged 15, is normal. V. 10 (L. H.), aged 11, a school girl, not at a special school, has a similar flare to her sister V. 11 (A. H.), she has red hair. V. 11 (A. H.), aged 9, has very dark hair, she has a flare of quite blanched skin in the middle of the forehead surmounted by a white lock; rest of hair dark brown, eyes brown, ruddy complexion, very black eyelashes. Rest of skin is brownish except for a diamond shaped leucotic patch on abdomen, the umbilicus being at the centre, and apex somewhat out of the median plane. V. 11, is a medium grade mental defective and is in a special school; she has had no serious disease, she commenced to walk at two years and to talk at “the usual age”; her deficiency was detected at school. She is now at nine years able to recognise two letter words and adds integers, *e.g.* $3 + 1 = 4$; she is attentive, but appears stupid and is peculiar in some ways; not obedient and rather mischievous, but not spiteful; her habits are correct and cleanly; on admission no sensible response beyond nods and shakes of the head. (H. Gertrude Jones, 1913.)

PLATE LIX. Fig. EE. “It is incorrect to assert, as many authors have done, that albinism is inherited in a rigid manner and in its completeness. For one sees, even in the first generation after the appearance of albinism, offspring occur, who are incompletely albinotic, that is intermediate. Thus I know of an albinotic man (I. 1), from whose marriage with a normally pigmented woman (I. 2) there were five children (II. 2, 3, 5, 7 and 8). Of these the three eldest (II. 2, 3, 5) were perfectly normal, the fourth (II. 7) was incompletely albinotic and the fifth and youngest (II. 8) a complete albino. Of these five children four married in their turn, the other (II. 5) died in youth. Of the children of the eldest daughter (II. 2) the eldest (III. 1) was an incomplete albino, the other five children (III. 2—6) were normal. Of the five children (III. 7) of the second daughter (II. 3) none were albinotic. Of the children of the incomplete albino, namely the daughter (II. 7), the eldest (III. 8) was an incomplete albino, and two others (III. 9 and 10) were normal. Lastly the youngest, completely albinotic daughter (II. 8), has two children (III. 11 and 12) both incompletely albinotic.” (D. von Hansemann: *Deszendenz und Pathologie*, S. 111, Berlin, 1909. In a letter to K. Pearson, July 5, 1913, Professor V. Hansemann states: “dass die in dem von mir erwähnten Falle von erblichem Albinismus angeführten intermediären Individuen in Bezug auf alle Teile intermediär gewesen sind, in Bezug auf die Augen, die Haut und die Haare. Jedoch ist die Kurzsichtigkeit nur bei diejenigen vorhanden, die auch ausgesprochen helle Haare haben, während bei denjenigen bei denen das Pigment der Haare und der Haut nur herabgesetzt ist, aber nicht vollständig fehlt, eine wesentliche Kurzsichtigkeit nicht besteht.”)

Fig. FF. Pedigree of complete and incomplete albinism in partridges. In 1890 in the Aisne Department appeared a covey of 10 partridges in a second nesting, which contained three albinos. II. 2 was quite white, II. 4 and II. 7 were white mixed with some normal colouring. It may be presumed that the parents of this covey I. 1 and 2 were normal, or they would have been recorded as albinotic, for it is clear that the birds were closely watched. II. 2, the completely albinotic female, mated in the first year with a normal and had 13 young, of whom III. 1 was a complete albino, III. 2, 4 and 5 were incomplete albinos. All were killed except the mother, II. 2, and one male incomplete albino III. 2. The mother II. 2 mated again next year and had a normal brood; her incompletely albinotic son also mated (separately) and had a normal brood. II. 4 mated with a normal and had a brood containing two incomplete albinos, III. 8 and 9; the actual number of normals not stated. The mother and the two albinotic offspring were killed. The incompletely albinotic male, II. 7, mated with normal females in two successive years, and in both cases the broods were normal; he was then killed. No case of albinism has since occurred. It deserves notice, however, that in a neighbouring district separated from the above by two kilometres of wood two albinos appeared in a covey of partridges 12 years later (1902), one supposed to be a female was wholly white and one supposed to be a male partially white. These two birds mating separately in the two following years had each normal broods, and then either emigrated or were captured by birds of prey. The author does not refer to the eyes of the completely albinotic partridges, but as he does refer to rose irides in a hen pheasant, a complete albino, killed in the same place and to those of a totally albinotic squirrel, he was probably fully cognizant of what is to be understood by describing the partridge II. 2 as a complete albino. (M. d'Anne: see Bibl. No. 631.)

Figs. GG—I I. H. Przibram's pedigrees of Angora cats. When both sides of the circle marking an individual are white, then the cat has both eyes *yellow*, when both are black, then the cat has both eyes *blue*. When right or left hemisphere only is white, that eye is yellow; when right or left hemisphere only is black, that eye is blue. In extremely young kittens the eyes are initially blue and change gradually to their final colour. In GG, III. 6 and in I I, III. 5 died too soon after birth, the first at

9 weeks and the second at 5 weeks, for the author to be absolutely certain that they would have maintained their blue character. The yellow pigment develops from the 2nd to the 3rd month. These pedigrees are especially instructive as indicating that complete blueness of the eyes may result from (1) one parent with normal eyes and one with one eye blue, (2) from both parents with one eye blue and (3) from one parent completely and the other partially blue. They further emphasise the close interrelations of partial and complete absence of pigment in the mesoblastic structures of the eyes. The blue-blue eyed cats were all perfectly deaf. According to Przibram the partially albinotic cats, i.e. blue-yellow eyed, were only deaf on the blue side, but this is not in accordance with the present authors' experience: see p. 522 of our Text and p. 524 for an additional cat pedigree. (Bibl. No. 635.)

Fig. JJ. Partial albinism; absence of pigment of hair and choroids but irides pigmented. II. 2, E. S., aged 6, seen by E. Nettleship at The Hospital for Sick Children, Great Ormond Street, in July 1911; she was an in-patient under observation, but her ailment turned out to be slight and unimportant. She had fair flaxen hair and no visible pigment in the choroids but her irides were opaque and obviously pigmented; refraction high hypermetropic, astigmatism (4 D.) according to rule in each eye. (No nystagmus recorded but I believe she had it. E. N.) Only one sibling, II. 1, aged 11, brown hair, grey irides and no nystagmus. Mother, I. 1, brown hair and grey eyes; her two sisters (I. 2) have still darker hair. Father, I. 3, black hair, sallow skin, deeply pigmented brown eyes. No kinship between I. 1 and 3. No history of fair individuals on either side during the past two generations. (Notes by Dr R. R. Armstrong, House Physician, 30th July 1911.)

Fig. KK. Complete albinism in native Africans. II. 2 and 3 two brothers in the village of Salabwe, Kapiri, Katanga, aged about 35. They are both "pink in colour." They are exactly alike in features and are children of the same parents I. 1 and 2 both normal natives, and no albinism is known in their families further back. II. 2 is married to a black wife, II. 1, and by her has a son III. 1 who has exactly the same colour and features as his father. (Notes sent by Mr I. H. Hayes of Kapiri to Dr Stöhr for E. Nettleship, November 1911.)

Fig. LL. An albinotic native African girl, II. 1, aged 6, of the Bazela tribe, from Kiona village on Lubuli river running into Lake Mweru. The child was 6 years old when photographed with her black father in or about the summer of 1911. The mother, like the father, is a normal "black" native. The child has negro mouth and features. (Facts, and a good photograph of father and child, from Mr I. H. Hayes to Dr Stöhr for E. Nettleship, 2nd August 1911.)

Fig. MM. *Pedigree of Premature Greyness.* Tradition says that a curse was pronounced in Gaelic on the family K. by a fairy; the antiquity of the curse is doubtful, although attributed to the 14th century. It runs in translation:

In the time of most numbers shall weakness come o'er them,
In the time of most weakness shall strength then restore them,
To their prime in their youth like the rushes they'll grow
As withers the bracken be their manhood laid low,
O'er the child's clustering ringlets shall age spread its snow.

The greyness in the members of the family is not rapidly progressive. A few grey hairs show in childhood. At adolescence there is a considerable sprinkling (not in tufts). By thirty years all members affected are practically grey. Our informant is IV. 10. II. 8 told her granddaughter IV. 10 that the "curse" was in constant evidence in her family, and said that her father I. 1 had shown it. In fact as a child IV. 10 gathered that the greyness was as common in the older generations as it was in her own.

In Generation II, II. 1—7 all died unmarried before 30, it is said; II. 10 was believed to be affected. His son, III. 13, in Jamaica is affected; there is no account of his descendants. II. 8 the grandmother believed affected; at least when quite young she used walnut pomade habitually. In Generation III all died except III. 10 before the age of 16, and as in the case of Generation II no record was kept of the greyness. III. 10 became grey, although not so early as some of the others and always wore a 'front' to hide it. In Generation IV every member who survived has exhibited premature greyness. IV. 12 and 15 died at 7 and IV. 13 at two months; it is not possible to say whether they would have been grey or not. In Generation V, the children of IV. 4—who was not so markedly prematurely grey as some of the others—have not hitherto developed premature greyness. Also one child, V. 13, of IV. 6 has escaped. Generation VI is as yet too young for us to determine in most cases whether they will be prematurely grey or not. VI. 1 was only two years old when the pedigree was drafted, VI. 2 only one year old; VI. 3 seems to have been born with some grey hairs; VI. 4 was only three months old; VI. 5's hair was sampled, when he was 3 years old, 5 years old and again at 7 years. There were isolated hairs, a portion of which was macroscopically pigmentless and a portion pigmented. Other macroscopically pigmented hairs showed microscopically but few pigment granules. The later samples show less variation; there is brown-yellow diffused pigment and plenty of granules. VI. 6's hair when aged $3\frac{1}{2}$ showed pigment granules in varying quantity in all hairs.

The curse appears to have applied to the whole K. clan, for premature greyness is reported to exist in another family of the same name from the same district. In this family we hear also of a son with "white hair, defective intellect and peering sight"—a case which looks like an albino,—but we have not been able to verify this statement, nor to definitely link up both K. families, which, however, claim kinship.

Fig. NN. A pedigree with ten albinos, an example of albinism affecting males only but transmitted by normal females. Only one of the albinos (V. 4) was seen and the history was from his mother (IV. 10). V. 4 (W. A. Sh.), first seen in January 1879, aged 15 and was under observation till March 1884, an intelligent lad, a shop assistant. Hair fair, irides light blue, fundi not well seen owing to nystagmus but seem healthy; choroids pale, lower half of each fundus being much paler than upper; horizontal nystagmus, rapid movement to left, slow to right; vision in January 1879 less than $\frac{2}{200}$ and 16 J.; H. 4 D., cylinders no use. After using +3.5 D. constantly for about a year he was able to read small words or letters of 6 or 8 J., and saw $\frac{2}{200}$, but did not improve further; no objective test for astigmatism seems to have been used. No note as to colour of pupils.

V. 5, brother, ?older or younger than V. 4, said to have bad sight and moving eyes and fair hair.—V. 6, the only sister, light hair and fair complexion but good sight and steady eyes.

Mother, IV. 10, seen, dark brown hair; father, IV. 11, died of consumption at 43; they were not blood-related and both had good eyes. No history of albinism or moving eyes in relations of IV. 11.—IV. 10 was eldest sister of 3 sisters and 3 brothers, IV. 12, 14 and 4, 6, 8; two of the brothers affected "worse than" V. 4, both have children all of whom are free (V. 2 and 3); the third brother, IV. 4, free, as are the sisters, IV. 12 and 14; IV. 12, married but no issue.—III. 7, the maternal grandmother, also the eldest daughter of her sibship, had 3 affected brothers, III. 1, 3, 5, each of whom had all their children normal. It was known that I. 2, the maternal grandfather of III. 7, also had the movement of the eyes like V. 4. All those affected are spoken of in Mr Gunn's notes as albinos. (Taken by permission from the late Mr Marcus Gunn's Case-Book, Vol. 1., p. 76, by E. Nettleship, 1911.)

Fig. OO. I. 2, a normal male married twice; by his first wife, I. 1, he had five normal children, II. 1—5, sex unstated; by his second wife, I. 3, he had eight children, II. 6—13, of whom II. 7, and II. 11, are albino boys, the other six, unsexed, were normal. I. 2 and I. 3, who are Germans, are described as "dunkel-blond," and I. 3 attributes the albinos to "maternal impression," there being another (unrelated) albino family in her birthplace. No other details as to parents. II. 7, aged 19, fairly strong, under average height, is a workman in an iron-construction factory, and states that he is only slightly inconvenienced by his lesser acuity of vision; learnt easily at school. Skin rosy white, no pigment on genitals (otherwise normal) or elsewhere, scars unpigmented. Hair of whole body white; hair of head, yellow white, straight, thick and feels like flax. Eyebrows and lashes same colour, the former reach to region of glabella. Author gives fairly detailed description of hair on all parts of body, of finger nails and of skin. Eyes: horizontal nystagmus and photophobia; pupils red and when light is incident on them contract to size of a pea; eyelids readily held together. Irises grey blue and in parts blood colour, owing to red reflex. Both eyes have marked myopic astigmatism. Teeth, with exception of two carious ones, in good condition, crowns, however, very small and the incisors set very far apart. II. 11, aged 11, is normally tall for his age, and although apparently of normal intelligence, can see so badly that he is at a school for mentally dull (schwachbegabte) children. Hair, yellowish white, shining and not particular hard or soft, fairly abundant. No eyebrows on region of glabella, but on body lanugo more marked than on brother's. Pink, dull skin, appears as if dusted with white and shows violet-blue veins through. Long white scar of an operation for appendicitis carried out five months before inspection shows no sign of pigment. Marked nystagmus, irides violet blue with red reflex, pupils bright red, promptly contract on incidence of light; high hypermetropia +8.0 on both sides. The extremely transparent irides allow not only the circular border of the lens to be seen, but also the ciliary process. The incisors are set widely apart. (Rille, Communication to the Medizinische Gesellschaft in Leipzig, January 28, 1908: see Bibl. No. 640^{bis}.)

Fig. PP. Three albinos in a sibship of nine and one in a cousinship. The three albinos IV. 7, 10 and 11 and their parents III. 3 and 4 have been seen. IV. 7, aged 21 (1911), irides blue, vision $\frac{2}{24}$, considerable myopia, R. about 8 D., L. about 5 D., high degree of convergent squint of R. eye; nystagmus not referred to; no note of colour of pupils but judging from the photograph it is practically certain they are red; no note of fundus; hair was quite white at birth and is nearly so still; is not married. IV. 10, aged 15, complete albino and hair was quite white at birth; constant nystagmus whether looking straight forwards or downwards, some convergent squint of R., vision $\frac{2}{18}$ each eye, hypermetropia about 4 D.; irides blue, pupils probably red but not recorded, no note of fundus; is fairly intelligent and recites and sings in public. IV. 11, aged 14, as albinotic from birth as the last two, reported to have convergent squint but it does not show decidedly in the photograph, nystagmus when he fixes but less marked than in IV. 10; vision $\frac{2}{24}$ with each eye, myopia about 3.5 D., but the glass only improves sight slightly, irides blue, colour of pupils and fundi not noted. IV. 1 and 6 very fair. IV. 12, an albino, no other particulars. IV. 2, aged 30, hair and eyes dark brown, vision normal. V. 1, aged 3, dark brown eyes, fair hair. V. 4, said to be very fair. No consanguinity between III. 3 and 4, nor, as far as known, in earlier generations. The albinism seems to come from the side of the father, III. 4, who has three very fair siblings, III. 5, 19 and

20, of whom III. 5 is the mother of the albino IV. 12. There appear to have been decidedly fair persons upon both sides of the ancestry of III. 4, viz. II. 3, 5 and 6, and I. 4. III. 4 himself, father of the albinotic brothers, is an intelligent and very fine man, dark and with dark brown eyes; when in the army was one of the show men of his regiment, the Grenadier Guards. His wife, III. 3, aged 53, has blue eyes and light brown hair, and is myopic about 3 D.; acuity of sight not recorded. Her mother, II. 2, was fair but not extremely so. Cause of death and age at death of IV. 1 and IV. 6, both very fair, not recorded. Good photographs of III. 4, IV. 2 with V. 1, IV. 7, 10 and 11. (From Dr T. L. Llewellyn, Bargoed near Cardiff. Notes taken in June, 1911.)

Fig. QQ. A pedigree of incomplete albinism. The child, II. 1 (M. G. D.), was attending school, and aged 9 when examined. She has extremely fair hair, and is the fairest in the family. The iris is blue, no red reflex visible; the choroid is moderately defective in pigment, but not so markedly as in a complete albino; there is slight myopic astigmatism; the corrected vision of each eye = $\frac{6}{12}$; no nystagmus. A smaller brother, II. 4, aged 3, present at the examination, showed the same characteristics. Further, another brother, II. 2, aged 6, and a sister, II. 3, aged 5, are said to exhibit the same conditions. There was no record of whether there were any younger children. The father, I. 1, is, possibly, of like condition, as he was not seen, but was reported to be "very fair." He has a cousin with "pink eyes" and nearly white hair. (The above account is due to Dr T. E. Ashdown Carr, Ophthalmic Surgeon to the Derbyshire County Council Education Committee. Further inquiries are in progress.)

Fig. RR. II. 1, Marguerite S., a clinically complete albino, aged 9 when examined (Nov. 14, 1904), is the only child of her parents. I. 1, her father, is aged 39, and II. 2, her mother, aged 30; the latter has never had a miscarriage. Both parents are blond-red. There is no consanguinity, nor any other case of albinism in the family. The antecedents are excellent, there has been no arrest of development nor any anomaly. The young albino is well-developed, and of the stature of a child of her age,—"*Disons cependant qu'elle est hémophile*," writes Dr Ginestous—a sentence which we do not interpret. Her skin is "*blafarde*" and covered by a white lanugo; she has abundant hair; eyebrows and lashes, as the hair, absolutely white. Irides blue grey, slight external strabismus of the right eye, pronounced nystagmus. Visual acuity is $\frac{1}{5}$ for each eye, which cannot be raised by any glass. With the ophthalmoscope the ocular globe is seen to be transparent, and the iris devoid of pigment until one finds at the level of the iris-circle limiting the pupillary orifice some traces of pigment. The fundus is typically albinotic. The albino is emmetropic, and not myopic, as is the rule. The feebleness of vision is not due to ametropia, but solely to the penetration of too intense light rays into the eye. Colour vision is normal. Photophobia exists, and she sees better in dusk than in a strong light. The amplitude of accommodation, which for a child of her age should be 14 diopters, is only 8. Skiagrams were taken, and the bony skeleton of the child was found normally opaque. (Communication from Dr E. Ginestous, of Bordeaux, to K. Pearson, June 29, 1913.)

Fig. SS. II. 2, Ernest D., aged 37, is a case of clinically complete albinism. Owing to defective vision, has been unable to follow a profession. His parents and his nine brothers and sisters are all brown. There has never been an albino in the family before II. 2, who is well-developed and presents no anomaly. His parents are not consanguineous. He is married, and has five *red-haired* children, III. 1—5, not albinos. Hair of head, eyelashes and brows, and entire hair-system white; colour of skin "*blafarde*." He suffers from intense photophobia, and the eyelids are kept lowered. The visual acuity is less than $\frac{1}{10}$; and the patient has difficulty in guiding his steps, especially in a well-lighted locality. The visual acuity is very little improved by concave glasses of 8 diopters, and remains less than $\frac{1}{10}$. He has horizontal nystagmus. The iris is grey-green. With the ophthalmoscope the ocular globe is seen to be transparent, the iris to be without pigment—"à peine y trouve-t-on quelques traces de pigment." The fundus is typically albinotic; the eyes are myopic of 8 diopters. The colour sense is normal. (Communication from Dr E. Ginestous, of Bordeaux, to K. Pearson, June 29, 1913. Cf. Bibl. No. 638, for the published accounts of Figs. RR and SS.)

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- 610 *BLANFORD, W. T. The Fauna of British India. Mammalia, p. 69, 1888—91 (Albino Leopard). Another white leopard was shown by Otto Bock at German Sporting Exhibition, Berlin, 1909.

- 611 *CALDANI, LEOPOLDO M. A. Congetture intorno alle cagioni del vario colore degli Africani, e di altri popoli; e sulla prima origine di questi. *Memorie di Matematica e Fisica della Società Italiana delle Scienze*. Tomo VIII., Parte II., pp. 445—457 (one coloured plate), Modena, 1799. [Gives Spanish names of various Indian and White crosses, also an account of an Italian albino female born of two peasants (c. 1790) in Faentine district (p. 456), quotes Francesco Berengher's view that mulatto × white woman gives a child whiter than its mother and mulatto × black woman a child more black than its mother, but in Caldani's plate we have for all cases of Negro, Indian, white and mulatto crosses blended colours.]
- 612 *YULE, SIR HENRY. Narrative of a mission from the Governor-General of India to the Court of Ava in 1855. London, 1858. [Reference to albinos and xanthous individuals in Burma, p. 95.]
- 613 *LISTER, JOSEPH (Lord Lister). On the cutaneous pigmentary system of the Frog. *Phil. Trans.*, Vol. CXLVIII., Pt II., pp. 627—643, 2 pl. London, 1859. [Causes of change of skin-pigmentation in the frog.]
- 614 *FLOYD, F. P. On the Chemical Character of the Pigment of the Negro skin. *The Chemical News*, Vol. XXXIV., pp. 179—180. London, 1876. *Journal of the Chemical Society*, Vol. I., pp. 329—330. London, 1877. [An early, but interesting, investigation, microscopic and chemical, of the situation and constitution of pigment in negro and white skins; there is double the percentage of ash from the negro skin and the ash contains double the percentage of iron.]
- 615 *KRUKENBERG. Vergleichend-physiologische Studien, I. u. II. Reihe (vier Mittheilungen über die Farbstoffe der Federn). Also Grundzüge einer vergl. Physiologie der Farbstoffe und Farben. Heidelberg, 1884. [Probably first distinction of lipochrome and melanin pigments in birds' feathers.]
- 616 *MARCHAL, PAUL. La coloration des animaux. *Revue Scientifique*, 3^e Série, Tom. x., pp. 12—18. Paris, 1885. [No original investigations.]
- 617 *HAECKER, V. Ueber die Farben der Vogelfedern. *Archiv für mikroskopische Anatomie*, Bd. XXXV., S. 68—87, 1 pl. Bonn, 1890. [Would appear to distinguish between two kinds of albino birds, those lacking lipochrome and those lacking melanin pigments.]
- 618 *BIEDERMANN, W. Ueber den Farbenwechsel der Frösche. *Archiv für die gesammte Physiologie des Menschen und der Thiere*, Bd. XXI., S. 455—508. Bonn, 1892. 1 pl. [A paper on the changes of colour which can be induced in frogs, especially the tree frog. He gives various experiments—giving them curare, strychnine, cutting nerves and muscles, putting them in a dry place, the effects of darkness and light, and in tree frogs, absence or presence of branches with green leaves. He mentions Lister's experiments. See No. 613.]
- 619 *MARC, SERGIUS. Beiträge zur Pathogenese der Vitiligo und zur Histogenese der Hautpigmentierung. Klinisch-histologische Untersuchung. *Virchow's Archiv*, Bd. CXXXVI., S. 21—41. Berlin, 1894. [The author supposes structural changes in skin due to changes in the nerve-system—a skin-atrophy which leads to or is accompanied by a pigment atrophy. He refers to the influence of the nerves on the pigmentation processes as noted by experiments on frogs by Leydig and Ehrmann, and he might have added Brücke, von Wittich, Harless and Joseph Lister (see references, *Phil. Trans.*, Vol. CXLVIII., p. 627. London, 1859).]
- 620 *HORNELL, JAMES. Notes on animal colouration. *The Journal of Marine Zoology and Microscopy*, Vol. I., pp. 4—8. London, 1893—1897. [P. 5, an Albino Lobster, pp. 6, 7, Albinism among marine animals.]
- 621 *WEBSTER, DAVID. [Account of Examination of Eyes of three living Female Albinos and one Male Albino.] *Ophthalmology*. *Archives of Pediatrics*, Vol. XI. pp. 764—766 and 831—833, New York, 1894.
- 622 *CARNOT, P. Recherches sur le Mécanisme de la Pigmentation. *Bulletin Scientifique de la France et de la Belgique*, T. XXX., pp. 1—82, 2 pl. Paris, 1896. [See Bibliography, No. 460.]
- 623 *FRINGS, C. Ein Fall von Schein-Albinismus bei P. machaon. *Societas entomologica, Organ f. d. Internationalen Entomologen-Verein*, Bd. XII., S. 81. Zürich, 1897—8.
- 624 *GROGAN and SHARPE. From the Cape to Cairo, p. 57. London 1900. [“There was an albino woman in the village; all her children, to the number of five, were also albino, and at several other villages in the vicinity I saw specimens, which would argue a strong hereditary tendency.” This was near Chivorno, south of Blantyre on the Shiré river.]
- 625 *FLORESCO, N. Relation entre le foie, la peau et les poils, au point de vue des pigments et du fer. *Comptes rendus de l'Académie des sciences*, Tom. CXXXIII., pp. 828—30, Paris, 1901. [Liver and skin of animals with dark hair contain almost double the amount of iron and of pigment that those of white hairs possess. Cf. No. 614.]
- 626 *FISCHER, E. Experimentelle Untersuchungen über die Vererbung erworbener Eigenschaften. *Allgemeine Zeitschrift für Entomologie*, Bd. VI., S. 49—51, 363—365, 377—380. Neudamm, 1901. [Effect of temperature on pigmentation.]
- 627 *BELLARD, H. Contribution à l'étude de la formation et de la nature de la matière colorante des ailes des Lépidoptères. *La Feuille des Jeunes Naturalistes*, Année XXXIII., IV^e Série, 3^e Année, pp. 141—146, 161—163. Paris, 1902—3.
- 628 *HUNTER, Q. W. A brief Anthropological Study in Color. *The Medical Age*, Vol. XXI., pp. 887—890, Detroit, 1903. [Account of offspring of a white girl and a “light yellow negro” (mulatto); three children said to present evidences of negro blood and the other three to have the very light colour and distinctive features of the Caucasian (p. 890). Not convincing, the “light yellow negro” passed as and married as a “white man.”]
- 629 *COUPIN, H. Influence de la nourriture sur la coloration des animaux. *Le Naturaliste*, p. 262. Paris 1904. [Review of Mandoul, influence of nourishment on pigmentation.]

- 630 *ANFRIE, E. À propos d'albinisme chez les Vertébrés. *La Feuille des Jeunes Naturalistes*, Année xxxvii., iv^e Série, 7^e Année, pp. 17—18. Paris, 1906—7.
- 631 *D'ANNE, M. Albinisme chez l'Ecureuil. Albinisme chez la Perdrix grise et le Faisan. *La Feuille des Jeunes Naturalistes*, Année xxxvi., iv^e Série, Année vi., pp. 182—3. Paris, 1905—6.
- 632 *BLANCHARD, R. Encore sur les nègres pies. Un cas inédit du début du xix^e siècle. *Bulletin de la Société française d'Histoire de la Médecine*, Tom. v., pp. 210—219. Paris, 1906.
- 633 *BLANCHARD, R. Nouvelles observations sur les nègres pies. Geoffroy Saint-Hilaire à Lisbonne. *Bulletin de la Société française d'Histoire de la Médecine*, Tom. vi. pp. 111—135, Paris, 1907.
- 633 bis NANCE, W. O. A case of complete albinism. *Illinois Medical Journal*, Vol. xii., p. 201. Springfield, U.S., 1907.
- 634 *MACURDY, HANSFORD and CASTLE. Selection and Cross-breeding in relation to the Inheritance of Coat-pigments and Coat-patterns in Rats and Guinea-pigs. *Carnegie Institution of Washington, Publication* No. 70, 1907, with two plates.
- 635 *PRZIBRAM, H. Vererbungsversuch über asymmetrische Augenfärbung bei Angora-Katzen. *Archiv für Entwicklungsmechanik*, Bd. xxv., S. 260—265. Leipzig, 1907. [See our Text, Part II., p. 524.]
- 636 *TORNIER, G. Nachweis über das Entstehen von Albinismus Melanismus und Neotenie bei Fröschen. *Zoologischer Anzeiger*, Bd. xxxii., S. 284—88. Leipzig, 1907. [Influence of nourishment on pigmentation.]
- 637 *D'ALMEIDA, EMMANUELIS. Historia Aethiopiae Liber i.—iv. Rerum Aethiopicarum Scriptores Occidentales inediti a saeculo xvi. ad xix., curante C. Beccari, Vol. v. Romae, 1907. [The word albino does not appear to occur in the Portuguese; there is, as in Bibliography, No. 27, the statement that while the Ethiopians are of black colour some are reddish or white.]
- 638 *GINESTOUS, E. Un cas d'Albinisme. *Société d'Anatomie et de Physiologie de Bordeaux*, Novembre 21, 1904, and Un cas d'Albinisme congénital. *Société de Médecine et de Chirurgie de Bordeaux*, Mai 26, 1909. [Descriptions of two individual albinos.]
- 638 bis ARONSTAM, N. E. Report of a case of extensive leucoderma successfully treated. *Detroit Medical Journal*, Vol. vii., p. 137. Detroit, 1907.
- 639 *FRITSCH, G. Vergleichende Untersuchungen der Fovea centralis des Menschen (Preliminary communication). *Anatomischer Anzeiger*, Bd. xxx., S. 462—4 and Bd. xxxi., S. 415—6, Jena 1907. [Refers to the examination of the eyes of an albinotic Herero from southwest Africa (p. 464). No "Foveabildung" visible with lens, but a microscopic examination showed "eine unvollkommene Ausbildung der Area centralis."]
- 640 *FRITSCH, G. Ueber den Bau und die Bedeutung der histologischen Elemente in der Netzhaut des Auges besonders am Orte des deutlichsten Sehens bei verschiedenen Rassen. *Anatomischer Anzeiger, Ergänzungsheft zum Bd. xxxii.*, S. 141—146. Jena, 1908.
- 640 bis *RILLE, (—?). [Zwei Brüder mit Albinismus totalis congenitus.] *Münchener medizinische Wochenschrift*, Bd. lv., S. 592. München, 1908.
- 641 *FEDERLEY, H. Ueber den Albinismus bei den Lepidopteren. *Acta Societatis pro Fauna et Flora Fennica*, Bd. xxxi., No. 4 (separate pagination, 28 pp., 1 pl.). Helsingfors, 1908. [Good paper with bibliography.]
- 642 *LISSAUER, A. Archäologische und anthropologische Studien über die Kabylen. *Zeitschrift für Ethnologie*, Bd. xli., S. 501—509. Berlin, 1908. [P. 518 states that many fair persons with blue eyes are found among the Kabyles.]
- 643 *MUDGE, G. P. Note on the chemical nature of albinism. *Proceedings of the Physiological Society of London*, 1908—9, p. lxvii, also 1909—10, p. xvii. London. [Attempts to show that albinos carry a chromogen and lack a ferment.]
- 644 *ABRAHAM, PHINEAS. A case of leucoderma. *West London Medical Journal*, London 1909, xiv. 38. [A woman aged 40 developed leucoderma and melanoderma during pregnancy, after birth of a baby extensive alopecia ensued. Under treatment hair gradually returned on scalp, but was white. It had not at time of report regrown on body or eyebrows; the leucoderma remained although less marked.]
- 645 *MAASS, A. Die anthropologischen Ergebnisse der Sumatra-Reise. *Zeitschrift für Ethnologie*, Bd. xli., S. 167—180. Berlin, 1909. [Pp. 171—172 have references to Albinism in the Malays of middle Sumatra.]
- 646 *BLANCHARD, R. À propos des nègres pies. *La Nature*, 38^e Année, No. 1906, pp. 3—8. Paris, 1909.
- 647 DORNINGUEZ, A. G. Un caso de leucoderma (gnito) curado. *Crón. méd. quir. de la Habana*, Vol. xxxv., p. 342. Locus? 1909.
- 648 *HUTCHINSON, SIR JONATHAN. Syphilitic Leucoderma and the pigmentary syphilide. *British Medical Journal*, Vol. i., pp. 85—87. London, 1909. [On the "dappling" of the skin which takes place in syphilitic leucoderma.]
- 649 *JÄGER, A. Die Entstehung des Melaninfarbstoffs. *Virchow's Archiv*, Bd. 198, S. 62—92. Berlin, 1909. [J. criticises (S. 81—85) Meirowsky's views on the origin of melanin pigment. He considers that Meirowsky's pigment from a pyrenoid substance was a fat, and not a melanin pigment, but apparently (p. 84) allows that the Finsen rays will produce melanin pigment in the zytosplasma.]
- 650 *LEVI, ETTORI. Albinismo parziale eredo-famigliare in negri della Luisiana. *Archivio per l'Antropologia e la Etnologia*, Vol. xxxix., pp. 5—13. Firenze, 1909. [See our Part IV., Extra Pedigrees, Fig. X., p. 128.]
- 651 LIBBY, G. F. A case of complete albinism; observations on the changes in the diameters of the lens as seen through the iris. *Transactions of the American Ophthalmological Society*, Vol. xii., pp. 246—248. Philadelphia, 1909, 1 pl. Also *Annals of Ophthalmology*, Vol. xix., pp. 245—247. St Louis, 1910.

- 652 MOORE, H. C. Negro Albinos. *American Journal of Dermatology and Genito-Urinary Diseases*, Vol. XIII., p. 327. St Louis, 1909.
- 653 FRANCA, S. Sopra alcuni disturbi tropici in una ragazza albina. *Pediatria*, 2 S., T. VII., pp. 432-4. Napoli, 1909.
- 654 *MUDGE, G. P. Problems in Mendelism and some biological considerations: Human Albinos. *Lancet*, Vol. I., pp. 857-859. London, 1909.
- 655 *SEABRA, A. F. DE. Description des types d'albinisme existants dans les collections du Museum de Lisbonne. *Bulletin de la Société Portugaise des Sciences Naturelles*, pp. 256-63. Lisbon, 1909. [Good descriptions of albinism in birds, animals etc. in Lisbon Museum.]
- 656 *Leucoderma among Parsis. *British Medical Journal*, II. 1827. London, 1910. [Letter signed D. M., L. M. and S.; it stated that leucoderma is on the increase among the Parsis, that the disease is considered a contagious skin disease in India, and that the sufferers are shunned by their fellows.]
- 657 *BLANCHARD, R. Un Nouveau Nègre pie. *Bulletin de la Société française d'Histoire de la Médecine*, Tom. IX., p. 213-7. Paris, 1910.
- 658 BONVECH, E. S. [Two cases of general albinism.] *Voyenno-med. J.*, Vol. CCXXIX., med.-spec. pt., pp. 579-603. St Petersburg, 1910.
- 659 HOLMES, B. Albinism in its relation to Medical Research. *Lancet-Clinic*, Vol. CIV., 393-395. Cincinnati, 1910.
- 660 *HUTCHINSON, JONATHAN. Notes from the Clinical Museum. Leucoderma. Leucoderma and Piebald skin. Leucoderma in Dark Races. Is Leucoderma always aggressive Addisonism? *The Polyclinic*. London, 1910, Vol. XIV., pp. 86-88. [H. showed two photographs of leucoderma given him by Dr P. Comrie, one of a woman of Negro descent and the other of a Portuguese. He states that Dr Philip Brito has recorded a case of leucoderma in mother and daughter in Ceylon. In the daughter at age of 20 the exposed parts were so white she might have been taken for a European.]
- 661 *HUTCHINSON, SIR JONATHAN. Palaeogenesis as explanatory of certain forms of disease. *British Medical Journal*, Vol. I., p. 980. London, 1910. [He suggests latent hereditary transmission as an explanation of the dappling which occurs in leucoderma colli.]
- 662 *HUTCHINSON, SIR JONATHAN. On palaeogenetic Face-pattern in Acroteric Piebalds. *British Medical Journal*, London, 1910, Vol. I., pp. 1479-1481. [Mainly about Buffon's piebald negress and the Three Striped Graces, the piebald negresses, of whom photographs are given in our Atlas, Part I., Plate VV. (158).]
- 663 *JONES, KENNETH H. Syphilitic leucoderma in a male. *British Medical Journal*, London, 1910, Vol. I., p. 747. [Case of a stoker recruit aged 21 of blonde Saxon type with very fair hair and blue eyes. The whole of the trunk both anteriorly and posteriorly, to about the level of the umbilicus, as well as the upper extremities as far down as the insertion of the deltoid muscles, was affected. The skin was to some extent pigmented, and in certain regions very dark indeed; whilst over the whole there appeared whitish rounded or oval mottlings or dappings, most obvious where the surrounding cuticle was most markedly coloured. Six months later the condition was only slightly less evident than before.]
- 664 *KEITH, A. Buffon's Engraving of a piebald negress. *British Medical Journal*, 1910. Vol. II., pp. 658-659. London, 1910. [A letter on above subject.]
- 665 *MCDONAGH, J. E. R. Leucoderma and Palaeogenesis. *British Medical Journal*, 1910. Vol. II., p. 405. London, 1910.
- 666 *MEIROWSKY. Kritisches zur Melaninfrage. *Virchow's Archiv*, Bd. 199, S. 561-6. Berlin, 1910. Reply to Jäger's paper, maintaining the 'Eiweissstoff' as opposed to the 'Fettnatur' of his pyrenoid substance. A rejoinder by Jäger will be found, S. 567-70 of the same volume of *Virchow's Archiv*.
- 667 *DAVENPORT, G. C. and C. B. Heredity of Skin-Pigmentation in Man. *The American Naturalist*, Vol. XLIV., pp. 641-672, 705-731. New York, 1910. [An attempt to demonstrate that albinism in man is a "unit character" and obeys Mendelian laws; 31 pedigrees are given in support of the authors' views.]
- 668 *RENSHAW, GRAHAM. Leucoderma and Palaeogenesis. *British Medical Journal*, Vol. II., p. 258. London, 1910. [Letter on atavistic origin of pattern in leucoderma.]
- 669 *RENSHAW, GRAHAM. Piebald Negroes. *British Medical Journal*, 1910, Vol. II., p. 659. London, 1910. [Letter about George Alexander Gratton "the spotted boy": see our Text, Part I., p. 240.]
- 670 *ROMAGNA-MANOIA, A. Un caso di albinismo parziale. *Atti della Società romana di antropologia*, Vol. XV., pp. 387-391. Roma, 1910. [Girl aged about 21, epileptic, with right spastic hemiplegia, and facial asymmetry. The mother said she had noticed the white spots at birth, but there was no similar case in the family. There was an irregular white patch of skin on left temple near the hair, with a few completely white hairs in it. A large patch on the abdomen extending from about the level of the umbilicus over the left side and reaching down to boundary of upper third of thigh on the inner side. Almost half of the pubic hair was white with a few black hairs through it. On the sacral region there was another small patch. Photograph.]
- 671 *SOLLAS, IGERNA B. J. Certain reactions of Albino Hair. *Nature*, Vol. LXXXIII., p. 96. London, 1910.
- 672 *TAYLOR, A. E. Palaeogenetic Face-pattern in Acroteric Piebalds. *British Medical Journal*, 1910, Vol. II., p. 914. London, 1910.
- 673 *THOMSON, E. Note on a case of ocular albinism in a dark-haired individual. *Ophthalmoscope*, Vol. VIII., p. 884. London, 1910. [Girl, aged 11, native of Co. Tyrone was brought to Glasgow Infirmary on account

of very defective eyesight since infancy. The child had dark hair, eyebrows and eyelashes and a darkish muddy complexion. Investigation showed that the eyes were perfectly albinotic. In the dark room, light from the ophthalmoscope was reflected through the irides; no pigment could be seen in the fundi; there was myopia, approximately 5 D, and nystagmus was present. Nothing could be elicited as regards eye defect in the family or ascendants: consanguinity in marriage was not admitted. The hair after washing and cleaning was distinctly "dark" brown. The aunt, who brought her, stated that the hair on the other parts of the body was similar to that on the scalp.]

- 674 *P ICTET, A. Nouvelles recherches sur la variation des Papillons; l'un des mécanismes de l'albinisme et du mélanisme. *Archives des Sciences physiques et naturelles de Genève*, iv., T. xxix., pp. 640—644. Genève, 1910. [Relation of pigmentation to structure. The author states that a correlation exists between the length of the wing scales in butterflies and their coloration, the long wing scales being associated with darker coloration.]
- 675 *P ICTET, A. Mécanismes de l'albinisme et du mélanisme. *Archives des Sciences physiques et naturelles de Genève*, iv., T. xxx., pp. 621—623. Genève, 1910. [Relation of pigmentation to environment. The author gives the result of subjecting the chrysalises of certain butterflies to high or low temperatures for three or four hours each day for several consecutive days. Of the males and females of the same species, some became darker and others lighter; in one case in the species *Vanessa Urticae* not a trace of colour was left. He states that the variations mentioned in this paper are figured in Vol. II. (1910) du *Bulletin de la Société Lépidopterologique*, Genève.]
- 676 *ATGIER. Un Nègre blanc; étude d'albinisme comparé dans la race noire et la race blanche. *Bulletins et mémoires de la Société d'Anthropologie de Paris*, Vol. LXIII., VI^e Série, T. I., pp. 451—455. Paris, 1910. [Probably the Dahomey negro described in our Text, Part I., p. 133.]
- 677 *FRASSETTO, F. Casi di albinismo parziale ereditario nella famiglia Anderson della Luisiana (S. U. d' A.) (Considerazioni sulla genesi delle acromia ed iperacromia congenite). *Atti della Società Romana di Antropologia*, Vol. xv., Fasc. II., pp. 155—171. Roma, 1910. See our Part IV., Extra Pedigrees, Fig. X., Appendix A, p. 128. Abstracted *L'Anthropologie*, T. xxii., p. 96. Paris, 1911.
- 678 *[White Negress with black child.] Reproduction of photograph from members of a troupe at Berlin. *Daily Sketch*, September 5, 1911. London, 1911.
- 679 *COOMBE, FLORENCE. Islands of Euphantment, London, 1911. Albinos in Banks Island Group, Melanesia.
- 680 *FINK, LAWRENCE G. Leucoderma in Burma. *The Indian Medical Gazette*, Vol. XLVI., pp. 176—8. Calcutta, 1911. [Mentions two Karens, brother and sister, both affected in the entire body, both married, children unaffected. Says Burmans consider heredity as a factor in the aetiology of the disease.]
- 681 *JONES, KENNETH H. Leucoderma undergoing pigmentation on exposure to sunlight. *British Medical Journal*, 1911, Vol. II., pp. 1652—1653. London, 1911. [Case of a youth aged 18 in navy, subject to leucoderma in a high degree. The condition affected the skin of the neck in front and behind as well as that of both the groins. He was of fair complexion with blue eyes. Not the slightest suspicion of syphilis. He had excellent health and had had leucoderma as long as he could remember. Six months later, the leucodermic patches on the neck which were exposed to the light had a reddish blush of inflammation and numerous oval and rounded areas of a brown colour had appeared in the two largest.]
- 682 *MCLEOD, J. M. H. Complete Albinism in a girl aged 6, with total absence of pigment in the skin, hair, choroid and iris. *Proceedings of the Royal Society of Medicine, London*, 1910—11, iv., Dermatological Section 7. London, 1911, pp. 7—8. [Girl, an only child, parents alive and healthy. Hair of scalp, long soft and silky, pure white in most places with here and there a whitish yellowish tinge. Skin, glabrous white or slightly pinkish, pupils deep pink, iris lighter greyish pink. She had photophobia and nystagmus, was otherwise healthy and not backward mentally, no history of any similar affection in the family. At birth she had long white hair reaching down as far as her eyes.]
- 683 *OCHS, B. F. Extensive Leucoderma in a colored man. *Journal of Cutaneous Diseases including Syphilis*, Vol. xxix., p. 111. New York, 1911.
- 684 *DYSON, WILLIAM, M.D. An Investigation of Cutaneous Pigmentation in Normal and Pathological Conditions. *Journal of Pathology and Bacteriology*, Vol. xv., pp. 298—322 (two plates). Cambridge, 1911.
- 685 *RENSHAW, GRAHAM. Leucoderma and Palaeogenesis. *British Medical Journal*, 1911, Vol. I., pp. 136—137. London, 1911. [He argues that Leucoderma is due to palaeogenesis [atavism], and that its association with alopecia areata and dermatitis atrophicans strengthens his argument. He gives instances of hairless particoloured animals. Hairless dogs, Mexican hairless cats, Siamese cats, white elephant, hippopotamus, rhytina, porpoise, white whale. The latter passes through 5 stages (1) primary fetal apigmentation, (2) natal hyperpigmentation, (3) phacism, (4) xanthism, (5) depigmentation. Its iris is dark blue. In several species of dolphins pigmentation seems almost inhibited.]
- 686 *ANON. [Mr Tom Jack, the "Ice King," albino with a weird shock of white hair exhibited at the Hippodrome, London.] *The Times*, London, April 9, 1912.
- 687 *J. B. [Arctic Fox.] Science and Nature. The White Fox. *The Scotsman*, May 14, 1912. Edinburgh, 1912. [Author seems to contradict himself in discussing whether winter change is by decoloration or change of hair.]
- 688 *BLASCHKO, A. Ein Neger-albino. *Berliner klinische Wochenschrift*, Jahrgang XLIX., S. 2128—2130. Berlin, 1912. [An account of an albino negro from Dahomey, apparently the man described in our *Monograph*, Part I., p. 133. Cf. No. 676 above.]

- 689 *BUNCH, J. L. Leucoderma and Premature Canities. *Proceedings of the Royal Society of Medicine*, v. Section for the Study of Disease in Children, pp. 159—160. London, 1911—12. Also *British Medical Journal*, 1912, Vol. II., pp. 781—782. London, 1912. [Girl aged 11 who some twelve months previously had developed some round or oval white patches on her neck and shoulders, these had extended and increased in number spreading also to her neck and limbs. Over the right frontal region of the scalp was a considerable quantity of quite white hair, the depigmentation extending to the roots. No syphilitic or hereditary history. The leucodermic areas were becoming less marked and diminishing in size, and the white hair had already acquired a considerable amount of pigment. Photograph.]
- 690 *DOUVILLE. Surdit  congenitale et Albinisme partiel chez le chien. *Bull. Soc. centr. de M d. vet.*, Tom. LXVI., pp. 396—329. Paris, 1912. [Sixteen cases of deaf dogs, with more or less white in coat, but not albinotic eyes.]
- 691 *PICTET, ARNOLD. Recherches exp rimentales sur les m canismes du m lanisme et de l'albinisme chez les lepidopt res. *M moires de la Soci t  de Physique et d'Histoire naturelle de Gen ve*, Tom. XXXVII., Fasc. II., pp. 111—278, 3 plates. Gen ve et Paris, 1912. [Has a bibliography containing 188 titles of works dealing with variations of pigmentation in butterflies. The writer states (p. 264) that various authors have sought to differentiate between total albinism, where the whole wing is pale, and partial albinism, which only appears on certain parts of the wing. His investigations show that the first is only a generalisation of the second and both are of the same nature.]
- 692 *MACRITCHIE, D. A tribe of white Eskimos. *Nature*, Vol. xc. p. 133. London, 1912—13.
- 693 *BEERS, NATHAN T. A single Case of Vitiligo. *New York Medical Journal*, April 26, 1913, p. 866. New York, 1913. [Good photographs, not very well reproduced, of the leucodermic negress, who appears in Schamberg's *Diseases of the Skin and the Eruptive Fevers*. Dr Schamberg inscribes his picture with the legend "Some of the white patches have later become partially restored with pigment." A comparison of Schamberg's and Beers' photographs shows only progression.]
- 694 *NAILSWORTH, C. L. H. Melanism among mice. *Country Life*, p. 363, March 8. London, 1913. [12 blue black mice caught with many wild brown ones in threshing a rick.]
- 695 *RAWLING, C. G. The Land of the New Guinea Pygmies. London, 1913. [Mentions p. 55 three full-grown men and a baby seen in Mimika district, Dutch New Guinea. Both men had hair of a dirty reddish colour, skins pale whitey pink with patches of darker hue (? eyes). Baby with sandy hair and pale grey eyes, photophobia. Another baby seen at Abota on the Kapav  river inland in same district, free of blotches, pale grey eyes.]
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- 697 *MEEK, A. S. A Naturalist in Cannibal Land. London, 1913. [Good photograph of an albino Papuan child of Triobriand's district, but no descriptive details.]
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- 699 *DALTON, N. A case of leucoderma, which died, with symptoms of Addison's disease, and in which cirrhosis of the suprarenals was found. *Proceedings of the Royal Society of Medicine*, Vol. I., Clinical Section, pp. 209—212. London, 1907—8. See also *Lancet*, 1908 (i), p. 1412. London, 1908. [Shows vagaries of pigmentation associated with pathological state of suprarenals.]
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